$4.00 a Year | Published Monthly | 50c a Copy

VETERINARY MEDICINE

JULY 1945

CONTENTS

Veterinary Progress, Policies and Comment.....215-224

Dehydrated Plasma with Penicillin for Topical Application, 215; Yellow Fever Virus in Blood of Sick Monkey, 215; Veterinary Service Districts Established in Saskatchewan, 215; Pigeons as Film Carriers for the Army, 215; Veterinary Corps Officers Dead Since January 1, 1943, 216; Unit Plaque, 216; Legion of Merit Awards, 216; Bronze Star Medal, 216; Purchasing Army Horses in Tibet, 217; The McGilvray Portrait Fund, 218; American Veterinarians Visit Royal (Dick) Veterinary College, 218; Sulfathiazole for Vincent's Angina, 219; Mounted Attacks in Modern Warfare, 219; Blood Flown to Battle Areas, 219; Infectious Equine Encephalomyelitis in 1944, 220; Meat Inspection in California, 220; Army Food Inspection in Italy, 220; Ample Supplies of Serum and Virus for Hog Cholera, 220; Merger of Fort Dodge Laboratories, 220; Items on Poultry and Eggs, 221; Opposition to the Control of Rabies, 222; Antivaccinationist Succumbs, 223.

Reminiscences V 224

Clinical Use of Penicillin for Strangles in Horses.....226

Blood Transfusion as a Treatment for Anaplasmosis....228

Weekly "Salting" with Phenothiazine to Control Parasites 231

Sexual Hormones in the Treatment of Prostatitis and Neoplasms of Aged Dogs.....235

Detection and Effects of Improper Slaughter in Dressed Poultry 238

Experiences in Army Veterinary Service.....241

Clinical Reports 246-251

Acetonemia with Trismus, 246; Comments on the Case of "Jamie," 246; Small Animal Euthanasia, 248; Penicillin Therapy in a Case of Secondary Canine Distemper, 250; An Atypical Case of Acetonemia, 251.

Abstracts 251-252

Effect of Testosterone on Dogs, 251; Effect of Cooling on Wound Healing, 251; An Aid to Fertility, 252; Tuberculosis in Domestic Carnivora, 252; Frozen Plasma, 252.

Useful Bulletins, Circulars, Reprints, Etc.....252

VOL. XI
No. 7

Entered as second-class matter Nov. 8, 1920, at the post office at Chicago, Ill., under the Act of March 3, 1879.

7632 S. Crandon Ave.
Chicago 49, U.S.A.

WART VACCINE

U. S. PATENT APPLIED FOR

Chick Embryo Origin

Research by Drs. Scott and Sanders of the Jensen-Salsbery Laboratories has made possible chick-embryo culturing of bovine wart virus. Thus a standardized sterile vaccine of maximum antigenic value is now available to veterinarians.

Supplied to Qualified Practitioners for Field Trial Use Only

Dosage Recommendations: For cattle and horses, 25 cc. by subcutaneous or intramuscular injection. This may be repeated in twenty days if indicated. For oral warts in dogs, give from 1 to 5 cc. according to body weight and repeat in five to seven days if indicated.

WART VACCINE Chick Embryo Method, is supplied in:
VIAL 50 CC. (Code: *Wartan*) $1.00
(Less Usual Discounts)

JENSEN - SALSBERY
Kansas City **LABORATORIES, INC.** Missouri

VETERINARY MEDICINE

Registered in U. S. Patent Office

VOL. XL JULY, 1945 No. 7

Published Monthly by the
VETERINARY MAGAZINE CORPORATION
7632 S. CRANDON AVE., CHICAGO 49, ILL., U.S.A.

$4.00 a year; per copy 50 cents; Special Issues $1.00

All matter appearing in this publication is copyrighted. No part of it may be reproduced without specific permission. Permission will be given if the purpose is unobjectionable. If there be any question as to the propriety of reproduction the author will be consulted.

Entered as second-class matter Nov. 8, 1920, at the post office at Chicago, Ill., under the Act of March 3, 1879. Entered as second-class matter under the title of American Journal of Veterinary Medicine July 19, 1910, at Chicago, Ill., under the Act of March 3, 1879.

D. M. CAMPBELL, *Editor*
7632 S. Crandon Ave., Chicago 49, Ill.
Telephone South Shore 7160

H. J. MOSTYN, *Eastern Representative*
P. O. Box 121, Sussex, New Jersey
Telephone Sussex 2F18

COPYRIGHTED, 1945, BY VETERINARY MAGAZINE CORPORATION

A grant in support of research on penicillin has been made to Iowa State College by the American Medical Association.

The use of dehydrated plasma as a vehicle for the sodium salt of penicillin in local administration has been reported. The proportion used was 10,000 to 20,000 units of penicillin combined with 0.2gm of plasma. When sprayed upon the wound surface, the mixture goes into solution and the tissues become yellow. A mixture of the penicillin with 0.2gm of plasma is sufficient for a fine frosting of an area of 100 square centimeters.

In the blood of a sick monkey, a marmoset, examined at the Rockefeller Foundation laboratory at Ithéns, Brazil, the active virus of yellow fever was found. The animal soon died of yellow fever. This is the first time in any country that a wild animal has been found suffering from yellow fever in its natural habitat. This discovery supports the theory that yellow fever is primarily a disease of jungle animals transmitted by jungle mosquitos, and is well named "jungle fever."

From April, 1941, to September, 1944, the Veterinary Corps of the Army inspected more than seven billion pounds of food products of animal origin at purchase; and made from one to a dozen additional inspections of these products before they were consumed by the military personnel. This includes only products purchased at the Quartermaster Market Centers and does not take into account the hundreds of millions of pounds of such products purchased locally by the various camps, forts, fields and other army installations.

Para-aminobenzoic acid, a member of the vitamin B complex, is reported to have given excellent results in the treatment of typhus at an American army hospital in Cairo, Egypt.

The Province of Saskatchewan has authorized the establishment of veterinary service districts which may pay up to $2,000 a year to encourage the practice, at uniform fees, of veterinary medicine and surgery in the district. One-half the funds required are supplied by the provincial legislature and one-half by the district served.

The amount of fats and oils produced in this country in 1944 totaled 10,900,000,000 pounds and exceeded by 3,700,000,000 pounds the average production of 1935-39. The output for 1945 is expected to fall about a billion pounds under last year's record production. The greatest increase was in lard—last year's production of 3,300,000,000 pounds exceeding by one and one-third billion pounds that of the 1935-39 average.

According to the Bureau of Public Relations of the War Department, pigeons have been found efficient as film carriers for the Signal Corps. Birds of average size and strength can carry three 4x5 pack-film negatives or 20 frames of 35mm film a distance of thirty miles in an average time of 45 minutes. The films are carried in a small capsule of aluminum or light-proof plastic about four inches in length and three-quarters inch in diameter. This is attached to the bird by means of a light, elastic harness. Pigeons can be released safely from planes traveling at 200 miles at altitudes up to 31,000 feet.

Veterinary Corps Officers Dead Since January 1, 1943

Lt. Colonel H. L. Anderson, born November 20, 1889, graduated from Ontario Veterinary College in 1916. Was stationed at Camp Butner, North Carolina, at the time of his death on March 1, 1944, of natural causes.

Captain Dell C. Bassett, born November 27, 1899, graduated from Cornell University in 1925. Died at Tilton General Hospital, Fort Dix, N. J., on January 10, 1945, of natural causes, following return to the United States from the European Theater of Operations.

Captain Paul C. Garner, born March 25, 1908, graduated from Iowa State College in 1937. Last stationed at Camp Campbell, Kentucky, with the 20th Armored Division. Died at Percy Jones General Hospital, Battle Creek, Michigan, on October 30, 1943, of natural causes.

1st Lt. Leo H. Hartman, born October 11, 1907, graduated from Ohio State University in 1931. Killed in airplane crash on December 29, 1944, while on duty in Alaska.

1st Lt. James Kral, born July 15, 1913, graduated from Kansas State College in 1935. Last stationed with 23rd Veterinary Station Hospital, Fort Bliss, Texas. Killed July 28, 1943, in plane crash at Biggs Field, Texas.

1st Lt. Herman L. Moser, born September 10, 1911, graduated from Ohio State University in 1936. Last stationed with 23rd Veterinary Station Hospital, Fort Bliss, Texas. Killed July 28, 1943, in plane crash at Biggs Field, Texas.

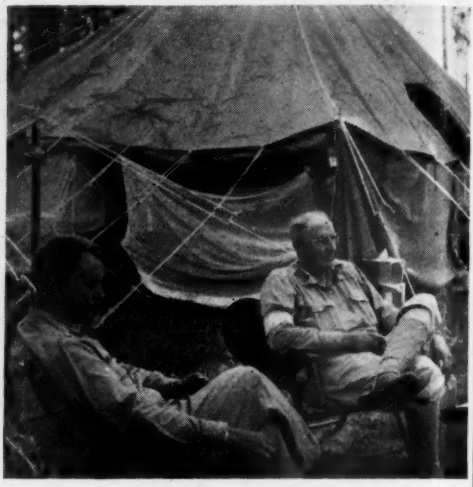
Captain Dale J. Yokum, born August 18, 1916, graduated from Kansas State College in 1940. Transport veterinarian. Died at sea January 29, 1944.

Unit Plaque Award

By command of Major General Danielson, Commanding General of the Seventh Service Command, Omaha, the Meritorious Service Unit Plaque was awarded, April, 1945, to 1798th Service Command Unit, Station Complement, Headquarters Detachment, Veterinary Section, Fort Des Moines, Iowa, for superior performance of duty in connection with food inspection activities throughout the State of Iowa during the last four years. The efficiency and speed in which the personnel of this section accomplish their food inspection duties despite distance, weather conditions, long working hours and ever changing contract and specification requirements, is worthy of commendation. The superior standards of discipline, morale and military and professional efficiency maintained by this section indicates that this award is well earned.

Legion of Merit Awards

For exceptionally meritorious conduct in the performance of outstanding services from March, 1941, to March, 1944, by direction of the President, the Legion of Merit was awarded



Right, Colonel Clell B. Perkins, V.C., recipient of the Legion of Merit Award, at the 30th Veterinary General Hospital, DeQuincy, La., in 1941. Left, Lt. Col. D. M. Campbell, V.C., commanding officer of the hospital

by the War Department to Colonel Clell B. Perkins, Veterinary Corps, United States Army, March, 1945.

For meritorious service while serving as Veterinary Liaison Officer with the 38th Division, Chinese Army in India, during the period 5 October 1943 to 15 August 1944, the Legion of Merit was awarded by the Commanding General, United States Forces, India Burma Theatre to Major John S. Haley, of the Veterinary Corps, United States Army, December, 1944. Major Haley, by his constant and unselfish attention to duty, materially assisted the Chinese Commander to keep to a minimum the incidence of animal illness. His outstanding work contributed substantially to the successful conquest of the Mogaung Valley.

Bronze Star Medal

On the occasion of his departure from the Asiatic Theater for the United States, Major Earl C. Ritter, V.C., Sumner, Ia., received the Bronze Star Medal for meritorious service from Major General R. E. McClure, Commanding General of the Chinese Combat Command.

Major Ritter was a member of an American liaison team attached to the Chinese Expeditionary Force in the Salween Campaign which made possible opening the new Stilwell Road.

Purchasing Army Horses in Tibet

The experiences of many of the veterinary officers in this global war have been as out of the ordinary for a veterinary practitioner as the imaginary happenings in "Lost Horizon," and none have been more unusual than the experiences of some of those in the China-Burma-India theatre.

Mention has already been made of experiences of veterinarians assigned to the "Y-Force" and to the Chinese Combat Command[1] with which the Y-Force has been merged and to experiences on horse-procurement boards.[2] Col. Daniel H. Mallan, V.C., is chief veterinarian of the CCC (Chinese Combat Command) and all veterinary officers and enlisted personnel engaged in the purchase of horses and mules in the China Theatre are under his supervision. American groups purchasing horses in the western portion of China are under the immediate supervision of Major Charles D. Ebertz. In the main these groups purchase animals for the CCC but some of them procure them, chiefly pack horses, for the Chinese Army. One such group is in command of Capt. Richard A. Shea, V.C., of Oklahoma City.

Captain Shea, with a lieutenant of the Remount Service, three enlisted men and a Chinese interpreter, was given an assignment to proceed to Tibet and procure 10,000 horses for the Chinese Army. In February they reached Tibet and set up headquarters (a tent) at an elevation of 12,000 feet and only 40 miles from Maya Gonga (Snowy Mountain), the third highest peak in the world. To this headquarters Tibetans bring horses for sale and from it trips are made to surrounding villages to purchase animals collected there. Chinese and native labor is employed to care for the animals after they are purchased. It took two months to purchase the first 1000 animals.

When 500 to 1000 animals have been purchased, branded and shod, they are turned over to a conducting party of Chinese and herded away on the 30-day trip through the mountains to China, where they are taken over by "Rear Echelon American Veterinary Officers" and checked over, reshod, given anthrax vaccine, rested. Then they proceed on the long journey to where they are needed. One of these horseshoeing shops, operated by Capt. Henry A. Bender, has been described.[3]

The Tibet horses are extremely hardy. They live the year around on pasture and are thin in the spring since the grass, which is brown and dry, is covered with snow for several months during the winter and the animals can't dig up enough of it to keep in good flesh. Because of the great need of the Chinese Army for pack horses and pack mules, the standards have been lowered, but no animals are purchased that are not serviceably sound. The chief causes of rejection are pathological conditions of the feet and legs.

Some of the customs of the country are a bit disconcerting till one becomes accustomed to them. When approaching a village one is made aware of its proximity by being fired upon. The convention requires that the visitors take cover and return the fire. After the

Col. Daniel H. Mallen, V.C., receiving the Bronze Star Medal from Brig. Gen. Frank Dorn "for meritorious service from 12 March to 10 September 1944" with the Chinese Combat Command. Col. Mallan is Chief Veterinarian of the CCC and has general supervision of veterinary activities in horse purchasing

exchange of shots has continued till each party is duly impressed with the marksmanship and quality of weapons of the other, a single individual from the visitors proceeds without weapons and convinces the villagers of friendly intentions of the former—if he can. Since this firing upon visitors always takes place at long range, to demonstrate the quality of the weapons, no casualties have as yet occurred in the experience of Captain Shea's group. After introductions are over the Tibetans are, in the main, friendly, although it was deemed wise to "evacuate" one village suddenly during the night.

When a group of horses collected at a village have been examined and a number found acceptable, haggling over the price begins and is sure to last a long time, sometimes several days. In fact, this "dickering" often must be prosecuted for some time before the buyers are permitted to see the animals. These negotiations are carried on, chiefly by "Gamma" the interpreter, with the "mayor" or headman of the village. The interpreter, although Chinese, spent seven years in the study of religion and

philosophy at Tibetan monasteries and is entirely familiar with their language and customs. Furthermore he is a born diplomat and a sort of "business manager" for the party.

The country is an interesting one for a practitioner from Oklahoma or anywhere else in the United States. There are no other Americans in this land of "Shangri La." The sole drink is strong woody tea flavored with yak butter. The remainder of the diet is yak meat, yak milk and barley made into a sort of flapjack. The fuel is dried yak dung which is burned in brasiers of about the size of a wash

basin. The houses are of stone and are three stories high. The ground floor is for the livestock, the second floor for the family. The top story is for hay and other feed and has a porch for praying. Llamasaries are scattered all over the country. One near headquarters is only 700 years old. It is where the interpreter, Gamma, studied. Another, several days' travel from headquarters which was visited, is more than 2000 years old, and houses one of the most revered Buddha idols in Tibet. It had never been visited previously by an American.

Two hundred yards back of the headquarters tent there is a fast-flowing stream which contains a great many fish which are easily caught with a seine. The Tibetans do not eat fish but the American party dines upon them twice a week. There are also numerous ducks on this stream which are not difficult to kill with a carbine and add variety to the ration.

An advanced emergency landing strip has been constructed near headquarters and an airplane arrives once a month with mail and supplies. It also took in a phonograph and some very welcome records on one of its monthly trips.

[1] American Veterinary Officers in the Salween Campaign. *Vet. Med.*, 40:3, p. 78 (March), 1945.
[2] Army Mules Bring High Prices in China. *Vet. Med.*, 40:5, p. 146 (May), 1945.
[3] With the Chinese Combat Command. *Vet. Med.*, 40:6, p. 183 (June), 1945.

The McGilvray Portrait Fund

As readers know, Dr. C. D. McGilvray retires this month, after serving the Ontario Veterinary College as principal for 27 years. The Ontario Veterinary Association has appointed a committee to solicit funds for an oil portrait of Doctor McGilvray to be hung in the Assembly Hall of the college as a tribute to the retiring principal.

The committee comprises Dr. Chas. A. Mitchell, Dominion Animal Pathologist, Hull, Que., chairman; Dr. A. L. MacNabb, the new principal of the school, treasurer, and Dr. A. J. Campbell, well known practitioner of Toronto.

Alumni and friends of the Ontario Veterinary College who desire to participate in this memorial to Doctor McGilvray are asked to send their contributions to the treasurer or other members of the committee. Make checks payable to—The McGilvray Portrait Fund.

Veterinary Graduate Courses

Preliminary plans have been made by the School of Veterinary Medicine of Kansas State College to provide refresher courses for veterinary officers when they are released from the armed forces. It is thought that such courses will provide assistance to some veterinarians in resuming their civilian status; those who have been occupied with specialized services in the army where they had little contact with clinical veterinary medicine, and those who went from school directly into the army and have had no experience in practice.

Present plans call for a four-week course with an enrollment limited to about 25. Veterinarians from civilian fields of endeavor will be accepted on the same basis as those formerly in the army. The course will be repeated as the requests materialize.

In the course only essentials and the newer developments will be stressed. Much of the subject material will be presented in the form of panel discussions. Features will be: breeding problems, new developments in animal surgery, therapeutics and diagnosis, parasitic diseases, sheep and swine practice, poultry diseases, nutrition, significant developments in infectious diseases, work in the clinic, ambulatory calls, and work in diagnostic laboratories.

The Division of Veterinary Medicine, Iowa State College has inaugurated a one-year course in veterinary hygiene for graduates in veterinary medicine. The course will deal principally with food inspection and leads to the degree of M.Sc. It is intended primarily for former officers of the Veterinary Corps.

Dissolving a tablet of sulfathiazole on the tongue every two hours is recommended for the treatment of Vincent's angina by officers of the medical corps of the Navy. The time of treatment of the average case was reduced from 10 days to three days by the oral use of sulfathiazole.

★★★ BUY WAR BONDS ★★★
AND HOLD THEM

Procaine Treatment for "Pesalgia"

The injection of procaine hydrochloride through the sole to painful areas in flat feet has reduced the average hospitalization for this condition among navy personnel from 33 days to six days according to reports from naval medical officers. The injections are made at three-day intervals and mild exercise (walking) is required following the injection.

The Scope and Limits of Mounted Attacks in Modern Warfare

Given the proper opportunity a mounted attack can prove successful, but the circumstances must favor such an attack; the attack must be supported by all cavalry weapons.

The combination of cavalry with tanks produces the most successful "mounted attack"; there should be very little gap between the tank and horse elements in such an attack.

Enemy aircraft is a serious hindrance to mounted pursuit.

A retreating enemy provides one of the best targets for mounted attack.

Accounts of actions by Red Army cavalry present a successful argument to support the contention that mounted attacks have a place in the warfare of this era.—Major V. Donskoi of the Red Army in *Cavalry Journal.*

Preparing for Post-War Period

The American Medical Association has established in its headquarters in Chicago a Bureau of Information to assist Army and Navy Medical Officers on their return from military to civil life. The Surgeon General of the Army has recognized the need for such assistance by discharged army officers by assigning a medical officer to the bureau as Liaison Officer between the Office of the Surgeon General and the American Medical Association.

The Bureau will advise officers about to be discharged of the educational opportunities afforded them under the laws of Congress, in all matters concerning state licensure, will facilitate the procurement of state licenses, and will supply medical, economic, financial and social information for any community in which the discharged officer may be interested. Already a list of hospital internships and residencies and other positions open to returning doctors has been compiled.

It takes the entire output of two cows to maintain eleven soldiers in action. The 11,000,000 persons in our armed services, therefore, make milk a critical war material, as they require the output of 5,500,000 cows.—*Certified Milk.*

Blood plasma, now prepared in enormous quantities for use of the armed forces, contains thromboplastin which, with calcium, acts on prothrombin to produce thrombin and blood clotting. It is easily separated from blood plasma and may become a valuable addition to available antihemorrhagics agents. Copley of the University of Virginia School of Medicine, employed thromboplastin in the treatment of induced shock in two dogs, with excellent results.

Blood Flown to Battle Areas

During March 193,000 pints of whole blood was flown in East and West Coast flights—150,000 pints of this blood was flown from the east coast to the European Theater. Thus it is possible for a wounded soldier to get blood within 24 hours after it is drawn from a donor in the United States. Each day's shipment provides transfusions for 300 to 400 average cases.

Through a new system of refrigeration blood keeps in condition five days longer than formerly, or as long as 21 days, according to reports from the Office of the Surgeon General.

Medical Care: Private or Public

While the mortality statistics suggest a high level of general health, the results of physical examinations show we are not a robust people. It would therefore seem that many of the splendid accomplishments of public health agencies are being nullified by failures in the application of curative medicine. Ways and means for correcting this defect should receive special consideration in any plan that is designed to improve the health of the individual citizen. Actually, as a people, we have not attained a level of health that is possible under the present state of scientific knowledge. Hardly anyone can envision the still higher levels that may be reached, should health become one of our chief social objectives, when the energies of the people can again be diverted from war to the pursuits of peace.—Mountin in (U. S.) *Pub. Hlth. Repts.*, 59:43.

Infectious Equine Encephalomyelitis in 1944

The final report[1] of the Chief of the Bureau of Animal industry, United States Research Administration on the prevalence of equine encephalomyelitis in this country during 1944, states that 19,590 cases were reported from 33 states. The number of cases reported for the past 10 years have been: in 1935, 23,512; in 1936, 3,929; in 1937, 173,889; in 1938, 184,662; in 1939, 8,008; in 1940, 16,941; in 1941, 36,872; in 1942, 4,939 and in 1943, 4,768. Last year the mortality varied from 100% in New Hampshire and New Jersey to 18% in Kansas and 16% in Nevada. For the whole country deaths averaged 24% of the cases.

Missouri, with 4,160 cases and 857 deaths, had the highest number in both categories.

It is estimated that about 800,000 horses and mules were vaccinated for the prevention of the disease. Reports on 242,650 animals, that were vaccinated in counties where the disease occurred, indicate that 56 cases and 23 deaths occurred in vaccinated animals. The incidence was 14 times as high in non-vaccinated animals in the same localities.

Perhaps it were well to point out that these failures of vaccination are not necessarily a fault of the vaccine. In all cases so far investigated, in which vaccinated animals contracted the disease, the vaccine was injected subcutaneously instead of intradermally. Last year, as in previous years, a considerable number of animals were vaccinated by their owners or other lay vaccinators and it is a reasonable inference that most of these failures of equine encephalomyelitis vaccination were due to improper vaccination.

Meat Inspection in California

Before the war state and state approved municipal inspection included about 79% of the total number of animals slaughtered under such supervision in the state; federal inspection accounted for the remainder. Since 1939 federal inspection has largely exceeded state inspection; the proportion in 1944 being 16% state and municipal and 84% federal.

In 1939 the total inspected animal slaughter in California was 5,790,886 animals; in 1944 it was 6,952,883. Of the latter 837,560 were slaughtered under state inspection, 290,624 under state approved municipal inspection and 5,824,659 under federal inspection. Estimated uninspected slaughter (farm killed animals, locker plants, etc.) comprised 247,000 animals. Of the inspected slaughter 25,598 whole carcasses were condemned as unfit for food, all but 225 because of disease.

Incidentally, this California experience gives an indication of how many diseased animals are eaten in states that provide no meat inspection for their citizens.

Army Food Inspection in Italy

The inspection of one and one-half million pounds of frozen beef from the United States is a monthly stint of the 72nd Veterinary Food Detachment, a unit of the Peninsular Base Section Ration Point No. 1, Rome, Italy. In addition, the detachment inspects a number of civilian plants that supply food for army use, including two ice cream plants, a yeast plant, a coffee plant, two ice plants, etc.

Other major food items inspected include about nine million eggs and 250,000 pounds of butter per month.

The 72nd Veterinary Food Inspection Detachment comprises Capt. Forrest A. Stepp, V.C., Iowa State College '43, who was practicing at Union City, Tenn., when he entered the Army, Cpl. Leo E. Greenland Laurens, Iowa, Cpl. Ernest E. Stone, Joy, Ill. The detachment expects to go direct from Italy to the Pacific Theater.

The Fort Dodge Laboratories has been merged with the American Home Products Corporation of Philadelphia, Pa. The former management and personnel of the firm will continue to operate the company and the sales policy of sale to graduate veterinarians only will remain unchanged. Facilities for research and production will be largely extended according to S. L. Barrett, formerly sales manager, now vice-president under the new arrangement. The Fort Dodge Laboratories was established 33 years ago by Doctors Baughman and Kaderbeck, practitioners of Ames, Ia. The firm was first known as the Ames Vaccine Company. It was moved to Fort Dodge in 1913.

In announcing that current supplies of serum and virus for immunization for hog cholera are ample, the Bureau of Animal Industry urges extensive vaccination. It is especially recommended for young pigs since with them there is greater freedom from the temporary adverse effects of vaccination, smaller quantities of serum and virus are required and such pigs are easier to handle.

It is estimated that in recent years the death rate from hog cholera has been less than 2% compared with 10% or more during some years before the virus-serum treatment came into use.

[1] For a more detailed report see *Vet. Med.*, 39:12, p. 435, 1944.

Dried egg production during 1944 increased 22% over that of preceding year—totalling more than 319 million pounds.

The increased egg production per bird over recent years is responsible for the relatively decreased amount of chicken meat per dozen eggs produced. From 1910-1914 it was 0.74 pound and in 1943 0.59 pound per dozen eggs.

Experiments at the Regional Poultry Research Laboratory at East Lansing, Michigan, indicate that the resistance of birds to lymphomatosis is influenced by the gonad and may be altered by the administration of sex hormones.

Poultry specialists of the USDA conclude, as a result of a four-year study, that the keeping quality of eggs in some measure is influenced by heredity and that by selection strains of birds, that produce eggs of superior qualities, can be developed.

Poultry Sanitation

When losses appear in a poultry flock the first thing to do is to get a correct diagnosis of the cause of the disease. Diseased birds should be taken to a good veterinarian. If no veterinarian is available, the experiment stations of the several states invariably have facilities for assisting the farmer to determine the disease attacking the flock.—*Hoard's Dairyman.*

Isolation rearing for the control of fowl leucosis has been demonstrated by Barber of the New York State Veterinary College. In the experiment one group of birds were brooded and reared at the station farm near old hens. At the end of a year 23% of these birds had died of leucosis. Another group of chicks from the same breeding stock were brooded and reared on a farm where there had been no chickens for years. A year later none of the isolation birds had died of leucosis. It has been found that when brooding houses are as far as 110 feet apart the loss from leucosis is from 5 to 16% as compared to 14 to 30% when the brooding houses are 40 feet apart. The longer the period of isolation the greater the control of leucosis is indicated by the following results:

Environment	Mortality from leucosis
Station reared	50%
Isolation reared for 4 weeks	35%
Isolation reared for 10 weeks	21%
Isolation reared for 19 weeks	13%
Isolation reared for 22 weeks	8%

Although the egg production during January declined 8% below that of the same month last year, the incubation of eggs during January increased 5% over that of January, 1944.

Poultry By-Products

The amount and variety of by-products conserved by the poultry packing industry continually increases which is, of course, advantagious to poultry raisers, processors and consumers of eggs and poultry meat—which makes it just about unanimous.

For table use, 26 to 28% of the poultry carcass is discarded and 11% of the egg is shell.

The plumage comprises 5% of the live weight of poultry. For the past three years the armed forces have used an enormous amount of feathers which formerly were, in the main, wasted. A single order was for 650,000 chicken feather pillows for the Navy and one million duck feather pillows for the Army. The Army's use for chicken feathers for camouflage is practically unlimited. Its requirement for goose down for sleeping bags for soldiers in the Arctic equals the entire supply. Then of course there is still the old market, for ornaments, clothing, upholstering, bedding, novelties, fish lures, etc. Recently it has been determined that feathers are adaptable for the manufacture of certain plastics, among them insulating wall board. This may in peace time require all now used in war.

Everybodys' Poultry Magazine

A fast-jellying stock is made from the feet and a demand is being developed for the combs either fresh or pickled. The blood is suitable for the same commercial uses as mammal blood. It is used also in manufacture of fish bait, and the viscera is usable for dog and fur animal food. Hatcheries can dispose of eggs that fail to hatch and chicks they cannot sell, to the manufacturers of hog feed. The shells are readily salable for poultry feed.

Special products from poultry processing include such delicacies as liver, combs, gonads, digestive ferments, various hormones and a rennet-pepsin used in the manufacture of a special type of cheese.

Humane Associations Conference Opposes Change in Legal Measures for Control of Rabies

A committee of leading figures in the national animal protection field, at a conference called by the American Humane Association and held at the Hotel Pennsylvania, New York, declared its opposition to HR 1986, now before the Congress.

This measure would bring "dogs, other carnivorous animals, whether domestic or wild," under the control of the Federal Bureau of Animal Industry, and is assumed to be primarily for the purpose of eradicating rabies.

An 11-point declaration of policy by the conference in relation to HR 1986 is as follows:

"1. We recognize the existence of rabies.

"2. We believe that rabies control measures are necessary.

"3. We believe that progress has been made in the development of prophylactic vaccine against rabies in the dog.

"4. We believe there has been an insufficient amount of evidence produced to date to justify the imposing of compulsory prophylactic rabies vaccination of dogs.

"5. We believe that in areas where rabies exists dogs should not be permitted in public places, unless effectively leashed.

"6. We believe that there should be strict licensing of all dogs.

"7. We believe that all stray dogs should be impounded.

"8. We believe that dogs or cats definitely known to have been bitten by a rabid animal should be confined or destroyed and that contact dogs or cats should be strictly quarantined for a proper period.

"9. We believe that the relationship between man and dog makes it an unsound policy to include the dog under regulations pertaining to livestock.

"10. We believe that the placing of dogs under the control of the Federal Bureau of Animal Industry in the form contemplated by HR 1986 is not the desirable means of obtaining rabies control.

"11. THEREFORE, It is the opinion of this conference that these ends can better be served by working toward uniform legislation in the drafting of which small animal practitioners and organizations dealing with dogs should participate. In no case should there be precipitate action."

Upon study, the policy proclaimed by the conferees is plain but it would be more understandable and save paper if it read:

"We oppose any change in the present legal status of rabies control."

The first 10 points are already in effect in laws or regulations or in commonly accepted procedures. All have signally failed over a long period in the general control of rabies; although they have succeeded locally.

To ask for uniform laws among the various states is to ask for something that has never been achieved on any subject from abortion to taxes. Uniform marriage, divorce and traffic laws—to cite only three—have long been sought without success or even material progress in their attainment. If rabies control must wait for uniform legislation on the subject in the various states, a century hence is too soon to expect it.

The last sentence in point 11 is really astounding. In view of the fact that rabies has been a plague in this country since at least as early as 1793, this warning, after 152 years, seems supererogatory, to put it conservatively.

In passing, one is impelled to ask what there is in the record of the Federal Bureau of Animal Industry that led the conferees to believe that placing control of infectious diseases of dogs under its management is not desirable. It has a long record of efficiency in the control of animal disease, well known to at least the veterinarians in the conference. The veterinary profession as a whole has long urged that the problem of rabies control be assigned to the B. A. I. The U. S. Livestock Sanitary Association, which includes the highest authorities on animal disease control in this country, is on record, officially, in favor of placing rabies control in the B.A.I. The conferees oppose such action, but do not say why.

It is a great disservice to dogs and the dog industry to oppose the control and eradication of rabies. Opposition to a change in the present plan of control is support of failure to control the disease. Point 8, alone, suggests a change in the present regulations for handling outbreaks of rabies. That point implies abandonment of general quarantine of dogs in districts in which there are outbreaks of rabies.

Dog News is less reticent about its reasons for opposing HR 1986. It says in part:

IMPORTANT
Bill Unfavorable to Dogs
Presented to Congress

A bill is now before Congress which, if passed, would change the status of the dog from that of personal property, to livestock, and would give the Bureau of Animal Industry, and the Secretary of Agriculture, the same control over dogs that they now have over horses, cattle or hogs.

While the bill does not appear formidable from reading, dog owners should bear in mind that if it were passed, *any restrictions covering domestic animals would automatically apply to dogs.*

Many municipalities have laws which prohibit keeping livestock within the city limits. If such a law were enforced, it would mean that no one living in certain territories, could own, even a pet dog.

It is no compliment to the readers of *Dog News* to assume that they do not know that livestock is personal property and not real

estate. It is equally uncomplimentary to infer that they are gullible enough to believe that giving the Bureau of Animal Industry control over diseased dogs, in the channels of interstate commerce, will affect a city ordinance. If these are the best reasons that can be adduced why HR 1986 should not become a law, the case of the objectors is indeed a poor one.

Dog World comes up with a new one, "Fight bill HR 1986 . . . provides, among other things, compulsory inoculation of all dogs in the United States and, in effect, puts the Government in the dog business." What will *Dog World* readers, who obtain a copy of the bill, think when they find there is no mention of "inoculation" nor any implication that it would be practiced. The statement about the Government being put into the dog business is just another bit of nightmarish fancy. Would a lobby with valid arguments resort to this type of opposition?

Perhaps there are some reasons why dogs suffering from infectious disease should not be amenable to the same restriction, on interstate movement, as other animals; but what are these reasons? Millions of animals move across state lines from farms to markets and from ranges to feedlots every year under control of the B.A.I. and are healthier and more humanely treated because of this supervision, than would otherwise be the case. Why would it not be beneficial for dogs also? What is there about canine diseases that sets them apart?

Clinical diagnosis of rabies by an experienced veterinarian is more dependable than a diagnosis made by any other means, save animal inoculation

Plainly a "write your congressman" campaign is on and an attempt is being made to flush the letters by any statement that gives promise. The distinguished veterinarians and humanitarians in the conference referred to, of course, will take no part in a campaign of misrepresentation, but will the public make a distinction? Isn't there an old proverb attesting to the difficulty of hunting with the hounds and running with the hares?

HR 1986 is a brief bill to amend section 1 and section 11 of the Act of May 29, 1884 as amended, which established the Bureau of Animal Industry and authorizes the Secretary of Agriculture to prevent the exportation of diseased animals and gives him control of interstate commerce in animals affected with a contagious, infectious or communicable disease. HR 1986 provides for inserting after "domestic animals" in Sec. 1, the words "and wild carnivorous animals" and after "livestock," wherever it occurs, in Sec. 11, "dogs, other carnivorous animals whether domestic or wild." Now, read again what the two dog magazines *say* the bill provides!

The protection afforded our livestock industry under this Act has been, to a large degree, instrumental in enabling it to become the envy of geoponics the world over. The fur farming industry has representatives in Washington right now, endeavoring to get into the same place the opponents of HR 1986 are trying to avoid. The fur producers wish to profit from B.A.I. research, which is famed throughout the scientific world.

A Die-Hard Antivaccinationist Succumbs

Among scientific publications the *Journal of the American Medical Association* has been the most tenacious in its opposition to rabies vaccination. In the past it has omitted no opportunity to proclaim the ineffectiveness of vaccination of dogs against rabies and has bolstered its statements with statistics of 1920 to 1926 and sometimes with Lentz' report in the *J.A.V.M.A.* of 1930. It has consistently disregarded the vast amount of scientific research and clinical experience with antirabies vaccination in the past dozen years.

However, in its issue for April 28, 1945, it abandons its former antiscientific attitude and in reply to an inquiry as to the justification for enforcement of compulsory vaccination of dogs in the District of Columbia states: "The experiments of Johnson and Leach have established that the single subcutaneous injection of a chloroform treated or carbolized antirabic vaccine produces a high degree of immunity in the dog. In Alabama the vaccination of dogs appears to be giving satisfactory results. An effective program to control canine rabies must include quarantine to prevent the spread of the virus by stray dogs and dog traffic. There seems to be no question that canine rabies can be controlled by means of quarantine and vaccination."

Reminiscences V

By NELSON S. MAYO
Highland Park, Illinois

THERE was relatively little cattle mange in Western Kansas when I left the state in '97, but as practically no control measures had been taken, when I returned in 1901 the western part of the State was well "peppered" with it and the B.A.I. had established regulations prohibiting the shipping of infected cattle out of the state. Vats were being constructed for dipping mangy cattle. Lack of proper control measures when the mange first appeared caused great losses in the state.

At a request from the Governor I went to a small station in Western Kansas to inspect some cattle that were in the pens there, and to advise the Governor whether they had mange. Some cattle which a state senator was planning to ship were being held up by a B.A.I. inspector, hence an appeal had been made to the Governor. The B.A.I. inspector was Dr. A. Eichhorn, and I met him for the first time there. The cattle were not shipped.

Eichhorn was a young veterinarian at that time, only a year or two out of college and but five or six years in this country but I was impressed by his ability. I didn't foresee though that he would become in turn chief of the Pathological Division of the Bureau, Director of the veterinary department of Lederle Laboratories and Director of the Animal Disease Research Center at Beltsville and would be one of the most widely known veterinarians in America and have it said of him when he received the 12th International Veterinary Congress Award in 1941:

"Adolph Eichhorn is a living example of the opportunity which America gives to young men of foreign birth. Friend, scholar, scientist, he is a world citizen and, as such, an appropriate recipient of the 12th International Veterinary Congress Prize."

Last winter we met again, not in a quarantined cattle yard in Western Kansas, but at the University of Havana to receive honorary degrees from that institution.

At this time, the Boer War in South Africa was in progress and the British had a remount depot near Kansas City, Mo., where they were buying horses and mules for their South African campaigns. The veterinarian at this depot was Capt. John Moore, who, as Major General Sir John Moore, was Chief of the British Veterinary Service in France during the First World War. At this remount depot, they were using the subcutaneous mallein test and of course declining to purchase animals that reacted to the test. A number of these reactors were reported to have been sold in Eastern Kansas and I was requested to investigate the matter. It was in this connection that I first met Captain, later Sir John Moore. He died a few years ago full of years and honors and Lady Moore met a tragic death during the London "Blitz" when a bomb struck the building in which she resided. While in London, after the close of the First World War, I was entertained by Sir John at the Army and Navy Club. He remarked that during the Boer War there was much public sentiment in the United States favorable to the Boers and, as a result, President Theodore Roosevelt requested the British to close their remount depot. As the Boar War was approaching the end, Sir John said that closing the remount was not a serious matter. He also told me that just before the outbreak of the World War I, the British Government planned to establish remount depots in Canada, close to the U. S. border, to draw on this country for animals but, when the War began, they were able to purchase horses and mules on the U. S. markets, so the remount depots were not established.

There had been a minor "cattle war" on a large ranch in Western Kansas that attracted much newspaper publicity and practically all the ranch help were under arrest. I had done some professional work there and the general manager asked me to go to the ranch with him. One day a streak of dust came down the valley made by a horseman running his horse. When he pulled up at the gate he proved to be a 15-year-old boy who said that he "had come to help lynch the ranch foreman." I told him that his intended victim was not being lynched that day and that he had better "beat it," which he did.

A report upon the death of a number of cattle from potassium nitrate poisoning, due to feeding corn fodder grown in an old hog lot, I published. As high as 25% of the dry weight of the stalks was potassium nitrate and the stalk, when lighted, burned like the fuse of a firecracker. Doctor Peters, of Nebraska, suggested that this might be a factor in cornstalk disease. About this time a student from western Kansas, a region called the "short grass country," came to the veterinary department looking for work to help him pay his way through college. His name was Kinsley—A. T. Kinsley. I gave him a job and a lantern to light cornstalks with and sent him out into cornfields testing stalks for potassium nitrate, but no discoveries were made. Later Kinsley

taught bacteriology in the Veterinary Department, while working for his M.S. degree. While I disliked to lose the services of Kinsley I thought he had gone about as far as he could without a veterinary degree and told him so, and assisted him what I could in making arrangements for him to "work his way" through the Kansas City Veterinary College by teaching. He more than "made good," both in school and afterward. I am pleased to have had a small part in starting hom on a career that made him one of the leaders in our profession and one of its most useful members.

"Dick" Bourne was a student assistant in the Veterinary Department at this time. He is now Professor R. F. Bourne, Colorado State College. D. M. Campbell also was a student at Kansas State College about this time, and spent considerable time about the veterinary department. It is possible that I in some measure influenced him in deciding to take a veterinary course. In any case both Bourne and Campbell soon followed the example of Kinsley and studied Veterinary Medicine. Mrs. D. M. Campbell (nee Gertrude E. Hole), assistant editor of VETERINARY MEDICINE, was a freshman in my class the year I left Kansas the second time. As a student and after graduation she was assistant in the chemical department of the college.

While attending the A.V.M.A. meeting at St. Louis in 1904 I received a cablegram from the Cuban secretary of agriculture, inviting me to come to Havana to consider a position in the newly established Agricultural Experiment Station. I had been three years at Kansas State College, engaged in teaching research and state work and was well satisfied, but I went to Cuba to see what it was like.

(To be continued)

Degrees Conferred on Doctor Mayo and Others

The formal investiture conferring the Honorary Degrees upon Drs. John R. Mohler, Nelson S. Mayo, W. W. Dimock and M. Sarvide, Dean of the Veterinary College of the University of Mexico, mentioned in reminiscences took place in the auditorium of the University of Havana in December, 1944—an interesting and colorful ceremony at which the Rector of the university presided. The Minister of Agriculture represented the government and the deans and professors of the university were present. A military band played national airs of the countries represented.

Beginning third from left, A. Eichhorn, Nelson S. Mayo, German Alverez Fuentis, Minister of Agriculture of Cuba; Clements Inclan Costa, Rector of the University of Havana; M. Gorvide, Dean of Veterinary College University of Mexico and W. W. Dimock at extreme right. This convocation took place in the Auditorium of the University of Havana. Afterwards the party visited the Cuban Agricultural Experiment Station where Doctors Mayo and Dimock were formerly employed. The veterinary hospital at Camp Columbia also was visited.

Dr. Julio San Martin gave a summary of accomplishments of the candidate, after which each was presented with a diploma, and a university medal was placed about his neck by the rector. Doctor Mohler was unable to be present.

In giving the response for the United States candidates, Doctor Mayo said, "I regret my inability to properly express our gratude and thanks for the honor that has been conferred upon us. Coming from our good neighbor, the Republic of Cuba, we consider it an honor to our profession in the United States as well as to us. It is an especial honor coming from the University of Havana which is among the oldest universities of the New World; a university that through the long years of its existence, in spite of difficulties, has held high the lamp of learning that means human progress and human liberty. Again we thank you for the honor conferred upon us."

After the ceremonies the recipients were given a luncheon, taken for a visit to the Government Remount Depot where they were tendered a country dinner of roast pig.

Clinical Use of Penicillin Strangles of Horses[1]

By WILLIAM K. SEMTNER
Stillwater, Oklahoma

THE effectiveness of penicillin in human medicine indicates the possibility that it may also be a useful therapeutic agent in veterinary medicine. Because of the nature of the disease and causal organism, there appeared to be a likelihood that penicillin might prove effective in treatment of strangles of horses. The present paper gives a preliminary account of the results of treatment of strangles with penicillin.

Methods.—Penicillin was used in the form of the calcium salt.[2] This was diluted with sterile distilled water or physiological saline solution to a concentration of 5000 Oxford units per cubic centimeter. The solution was injected intramuscularly. Individual doses of 100,000 units of penicillin were given at intervals of three to four hours. From five to nine doses were administered to each animal.

When distilled water was used as a diluent, swellings developed at the sites of injection; these disappeared after 18 to 24 hours with no apparent ill effects. When physiological saline was substituted for distilled water, such swellings did not occur.

Of ten horses treated, six recovered promptly. The remaining four showed marked improvement temporarily, but relapsed following discontinuance of penicillin therapy. Opportunity was not afforded to continue the penicillin treatment following the relapses. However, judging from the improved condition after the initial treatments, it is quite possible that these cases would have made complete recovery had the treatment been continued.

Bacteriological examinations were made of the nasal exudates and pus from abscesses of the horses treated. A short gram-positive streptococcus was isolated consistently. On blood agar plates, it formed a wide zone of beta hemolysis. Mice injected with the streptococcus succumbed in 24 to 36 hours. The potency of penicillin against the streptococcus was tested in vitro following a procedure suggested by Dr. Gladys L. Hobby. The organism was found to be totally inhibited by concentrations of 0.04 to 0.08 Oxford units per cubic centimeter.

Experimental Results

Case 1.—March 19, 1945, a mare had what appeared to be a light case of strangles and was treated with penicillin. A short-chain streptococcus was isolated from the nasal discharge. This mare was given five doses of 100,000 units each of penicillin at four-hour intervals. Before treatment had been completed, the animal's appetite had returned and the nasal discharge had diminished and become of a more serous nature. It soon disappeared entirely and the mare remained normal.

March 28, 1945, an extensive outbreak of strangles in a herd of quarter horses was brought to our attention. Additions of new stock were made to this herd frequently, and a number of horses had just been returned from a rodeo circuit. A group of six horses was selected for treatment. The animals were chosen to include different stages and degrees of infection and ranged from a case of two weeks' standing in which there was a profuse nasal discharge and swollen glands to a case that had just begun to cough but was carrying a temperature. Swabs were taken from nasal discharges and from abscesses and, on bacteriological examination, these yielded the typical organism of strangles.

Treatment consisted of five injections of 100,000 units of penicillin, each administered intramuscularly in 20cc of sterile distilled water at three-hour intervals.

Case 2.—"Bonnie Reed," a two-year-old mare with symptoms of anorexia, coughing, depression, temperature of 104.0° F. and an abscess in the submaxillary region. On the day following treatment, the mare's attitude was bright, temperature was normal, and she was munching hay. Her temperature remained normal throughout the day, but she suffered a relapse. More abscesses developed, broke and drained. The mare showed considerable loss of weight and condition.

Case 3.—"College Colt." an 8-month-old colt, showed depression, cough, slight discharge from nostrils, temperature 103.0° F. and an extensive swelling giving the head a lop-sided appearance. Following treatment, the temperature returned to normal, the swelling diminished and the colt appeared bright and

[1]Contribution of the Research Foundation of Oklahoma Agricultural and Mechanical College. Accepted for publication May 11, 1945.
[2]Acknowledgment is made to the Cutter Laboratories, Inc., Berkeley, Calif., who generously supplied the penicillin used in these experiments.

frisky. The swelling disappeared entirely and the colt recovered within a few days.

Case 4.—"Jim," a colt with a small abscess in the intermandibular region, a temperature of 103.0° F. and some depression. After treatment with penicillin, the temperature returned to normal and the colt made a complete recovery.

Case 5.—"Fussy," a four-year-old gelding with profuse drainage from the nostrils, great depression, temperature of 103.5° F. and large abscesses in the parotid and sublingual regions. The animal improved following the treatment, but relapsed soon after it was discontinued.

Case 6.—"Rocking Chair," an eight-year-old gelding that was coughing, discharging from the nostrils, and carrying a temperature of 104.0° F. The case cleared up satisfactorily following treatment.

Case 7.—"Chicken," a four-year-old mare which had just started to display a cough and had about one degree elevation of temperature. Following treatment, she showed no more symptoms and was sold two days later.

April 13, 1945, three additional horses were treated. The treatment was similar to that in the preceding cases, but more injections were given, and physiological saline rather than distilled water was used as the diluent.

Case 8.—A four-year-old stallion which had refused feed since the previous day showed marked depression, was trembling and coughing occasionally, and carrying a temperature of 104.5° F. When offered water he appeared thirsty, but had difficulty in swallowing. Nine doses, each of 100,000 units of penicillin were given with an interval of nine hours between the 6th and 7th injections. The temperature returned to normal and the horse appeared markedly improved throughout the following day. The next morning the temperature was 106.0° F. and symptoms were pronounced.

Case 9.—A six-year-old gelding in a similar condition was given 800,000 units of penicillin with results comparable to those in Case 8.

Case 10.—A four-year-old mare with a purulent discharge from the nostrils, cough, and swollen lymph nodes about the head, was given 800,000 units, following which the symptoms disappeared, and recovery was complete.

Discussion

The successful cure of strangles in six of the 10 horses treated, and the temporary amelioration of symptoms which suggests the possibility of cure by additional treatments in the remaining four, indicates the probability that penicillin has value in the treatment of this disease. These preliminary results justify further and more extensive testing of penicillin for this condition.

One of the outstanding results of penicillin therapy in these cases has been the consistent drop in temperature following treatment. Unless penicillin has some antipyretic property, which has not yet been ascribed to it, it must be assumed that the drop in temperature was due to inhibition of the causative organism by penicillin. This appears to be the case, as indicated by subsequent rise in temperature of horses which experienced relapses. The rise usually occurred following a longer period than is considered necessary for elimination of pencillin from the body.

Disadvantages of the penicillin treatment include the rather high cost of the amount needed, and the fact that a veterinarian's services are required for a series of inoculations at three- to four-hour intervals.

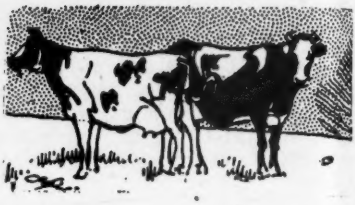
There is a prospect, however, that both of these disadvantages will be overcome. The cost of penicillin has dropped at an extraordinary rate with its large scale production and, in all probability, will continue to decrease to a level which will make it practical in ordinary veterinary practice.

With regard to the second disadvantage, recent discoveries are making it possible to retain the potency of the drug in the animal for longer and longer periods before it is eliminated, and this suggests that fewer injections will be required in the future.

Summary

Ten horses with typical cases of strangles of different degrees of severity were treated with the calcium salt of penicillin. Six recovered completely, while four showed marked improvement, but relapsed 24 to 48 hours following treatment. Swelling occurred at the point of injection when the penicillin was diluted with sterile, distilled water, but not with physiological saline as the diluent.

Blood Transfusion as a Treatment for Anaplasmosis



By H. C. SMITH* and D. E. HOWELL**
Stillwater, Oklahoma

Introduction

THE therapeutic use of transfused blood in veterinary medicine has been on the increase for some time. Its value in the treatment of hemorrhage, obstetric complications, dehydration, anemia, debilitating conditions, and certain parasitic blood infections has been demonstrated frequently. Improvements in the technic of transfusions have been made so that it is possible now to use blood treatment routinely in animal clinics and even under field conditions.

Some experimental evidence indicates that, in animals, the beneficial effects of blood transfusion in hemorrhage are due, not to the increased oxygen-carrying capacity of the blood, but to the transfused fluid remaining longer within the blood vessels, than does any blood substitute.

During an experiment with the use of various chemotherapeutic agents in the treatment of anaplasmosis, we had an opportunity to do some blood transfusions on the animals on the same ranch. The blood transfusions were made at various times during the enzootic. The animals were treated just as we could get to them in the pastures. In the experiment[10] alluded to, intravenous injections of dextrose, calcium gluconate, sodium cacodylate, aricil, sodium sulfathiazole, sodium iodide, neosalvarsan, tryparsamide, sodium chloride and formalin were tried without notable success. It was hoped that blood transfusion might mitigate the extreme anemia until the recuperative processes could overcome the invading organisms.

Review of the Literature

Rosenbusch,[9] *et al,* used cattle serum from latent cases of anaplasmosis as a curative agent. They found that the serum contained no lytic properties for anaplasma bodies.

Cuilli,[3] *et al,* concluded from their study that blood transfusion is the preferable therapeutic procedure in the treatment for anemic conditions of domestic animals. Intravenous transfusion is recommended in the treatment of acute anemia, and subcutaneous transfusion in chronic anemia.

Lienhardt,[6] *et al,* used "hyper" blood in an unsuccessful attempt to prevent infection by artificial inoculation of animals with virulent blood.

Boynton[1] showed, by injecting susceptible calves with blood from recovered cases of anaplasmosis which had been previously treated with sodium cacodylate, that these recovered animals remained carriers of anaplasmosis and after calves were injected with this blood they also showed evidence of the disease.

Boynton[2] tried blood transfusions a few times in some field cases of anaplasmosis but felt that this procedure was too dangerous for field practice because of fear of transmitting anaplasmosis and other blood transmitted infections. He considers blood transfusions feasible only under strictly controlled laboratory conditions.

Meads[8] in 1928 treated 15 cases of anaplasmosis in cattle with 225 grains of sodium cacodylate dissolved in 200cc of distilled water and 250cc of 50% glucose solution. Of the 15 cows so treated, five lived and 10 died. In the same year he used the same combination of drugs and, in addition, he transfused the animals with one-half gallon of blood. Thirty-two were treated in this manner, of which only eight died. In 1939 he used the same combination and treated 11 cows with but three deaths. In 1940, 17 were treated with five deaths. In 1941 he changed his treatment by eliminating the sodium cacodylate but continued with the glucose and 2000cc of oxalated blood. He treated 32 with six deaths. We believe Doctor Meads was the first to use oxalated whole blood in the treatment of anaplasmosis of cattle in Oklahoma.

Koger,[5] Doctor Meads' assistant, used various amounts of oxalated blood from healthy cows injected intravenously. He reports that blood, if used early, seemed to reduce the mortality in anaplasmosis.

Farquharson[4] obtained his best results in cases treated by the use of blood transfusions. Sometimes the transfusion had to be repeated. He is of the opinion that blood transfusions are promising in this disease.

Stiles[11] has recognized the value of citrated blood in large amounts, if given early, as an aid in the treatment of cattle suffering from anaplasmosis.

*Associate Professor of Veterinary Science, Oklahoma Agricultural Experiment Station.
**Assistant Professor of Medical Entomology, Oklahoma Agricultural Experiment Station.

Procedure

Methods of obtaining blood.—In these experiments, donor cows were selected from the dairy herd maintained to supply milk for the ranch where this work was done. No anaplasmosis had occurred in this group. Only animals in good condition were used. Each cow was confined in a dehorning stock and held in position by poles running across the stock in front and behind the animal. The head of the animal was elevated and held to one side by means of an improvised halter made from a lariat rope. The area over the place where the blood was to be drawn was washed with ordinary soap and water and the hair over the jugular vein was clipped with a pair of curved shears. One cowboy held the rope that encircled the animal's neck in order to keep the jugular vein distended. With a small scalpel an incision about one-fourth inch long was made through the skin over the vein and the blood was drawn with a large needle. An ordinary horse trocar makes a handy instrument to use in case a large needle is not available to draw the blood. The trocar can be inserted in a rubber tubing of the same diameter as the trocar after the stilet has been removed. Any length of tubing may be used.

The blood was drawn into an ordinary 1500cc vacuum bottle, to which had been added a solution containing 3% sodium citrate, 50% dextrose and 2% sodium sulfathiazole, in distilled water. Fifty cubic centimeters of this solution was sufficient to preserve 450cc of blood. The concentration of the resulting mixture was 0.3% sodium citrate, 0.2% sodium sulfathiazole, and 5% dextrose. The citrate was used to prevent coagulation, the sodium sulfathiazole to prevent bacterial growth and the dextrose to protect the blood cells from injury.

The amount of blood obtained from any one bleeding did not exceed 8000cc. The bottles were sealed, placed in carrying racks provided for them and transported to the pastures in a truck. No icing nor refrigeration was necessary as the weather was warm and we desired to give the blood as near body temperature as was possible.

Methods of Administration

Two methods of giving the blood were used. One was the use of gravity flow apparatus which required about 20 minutes to administer 2000cc. The other made use of a two-way valve attached to a long 40cc syringe. Between the syringe and the needle about a foot of heavy-walled rubber tubing was used to allow for the motion of the animal, which might otherwise have dislodged the needle. The latter method was faster than the gravity flow and required only 15 minutes to inject 3000cc.

No discomfort nor other symptoms of the cattle were noted at any time during the transfusions. The blood was used as soon after it was drawn as possible, but several bottles that were used successfully had been stored in the ice box over night.

Results and Discussion

It will be noted in the table that 18 cows were given blood transfusions. Of this number three died and 15 lived. Of the six animals of which the hemoglobin was taken, at least three had less than 35%. One, number 103, had on October 9, 1942, a hemoglobin of only 25%. She was very ill on that day, having a temperature of 105.2° F. This cow received 3000cc of blood on October 9; the following day she was given 5000cc of blood that had been kept in the ice box during the preceding night. No reaction during or after the administration of the cold blood was noted. The cow died on October 11. No doubt this cow did not

TABLE I.—INTRAVENOUS INJECTIONS OF 2000CC TO 3000CC OF CITRATED BLOOD

	Date	No.	Wt.	Condition	Temp.	Hemo.	Bl. Smear	Age	Pox	Results
1	9-13-42	20	750	fair	101.7	not det.	Positive		N	died 9-16-42
2	9-13-42	21	800	fair	103	not det.	Positive		N	lived
3	9-13-42	22	800	fair	104	not det.	Positive		N	lived
4	9-13-42	23	850	fair	103	not det.	Positive		N	lived
5	9-13-42	25	1400	fair	105	not det.	Positive		N	lived
6	9-14-42	26	850	fair	103.2	not det.	Positive		N	lived
7	9-14-42	27	750	fair	103.4	not det.	Positive		N	lived
8	9-14-42	28	850	very weak	101.4	not det.	Positive		N	died 9-20-42
9	9-14 42	29	800	fair	101.6	nat det.	Quest.		N	lived
10	9-14-42	30	800	good	107.5	not det.	Positive		N	lived
11	9-14-42	31	900	good	106.2	not det.	Positive		N	lived
12	9-14-42	32	850	good	106.3	not det.	Positive		N	lived
13*	10-9-42	103	700	very poor	105.2	25%	Positive	7	P	died 10-11-42
14	10-9-42	104	800	fair	103.2	35%	Positive	5	P	lived
15	10-9-42	105	800	good	103	65%	Positive	6	P	lived
16	10-9-42	106	850	fair	100	55%	Positive	6	P	lived
17	10-10-42	107	900	good	101.4	35%	Positive	6	P	lived
18	10-10-42	108	900	good	101.4	65%	Positive	10	N	lived

*5000cc additional administered 10-10-42.

have the power to regenerate new cells. The additional blood was given to determine if a large volume of blood was necessary or helpful in recovery.

Dairy animals are more satisfactory than beef animals as blood donors for several reasons. They are more used to being handled. The muscles of the neck are not as heavy and the neck is longer, which makes the bleeding easier; and a more sterile product can be obtained more easily.

Should suitable animals not be available as donors on the farm, blood may be obtained from a local slaughtering establishment. There may be a drawback to this procedure in that previous history of the animals could not be obtained, but the chance of spreading blood diseases in this manner would be rather remote if the blood was obtained in an abattoir under federal inspection. If necessary, such blood could be collected in advance and stored in the ice box for several days until ready for use.

A dosage of 2000 to 3000cc of blood was selected as the largest amount that could be given without the danger of unfavorable reaction. It has been shown[7] that small amounts of blood, which do not cause a reaction in the recipient, are more beneficial than large amounts which cause a reaction, from the standpoint of increase in value of the hemoglobin of the recipient. The hemoglobin of some of the cows that were given from 2000 to 3000cc of blood was tested 15 minutes to several hours later and it was found that this amount of blood raised the hemoglobin approximately 5%. This increase in hemoglobin is of definite value in many cases.

The dehydration which occurs in animals suffering from anaplasmosis may be due to two factors. First, the destruction of the red blood cells due to the action of the parasites. Second, a deficient amount of fluid intake by the affected animal. Both of these factors may be altered by indirect transfusions of citrated whole blood.

Summary and Conclusions

A short review of the literature pertaining to the work done by other research workers is given. The results of blood transfusions in 18 cows affected with anaplasmosis is shown in Table I. It will be noted that of 18 animals given transfusions only three (16⅔%) died, and of these only one (No. 1) could have been expected to recover under any treatment. Eliminating the moribund cases gives a recovery rate of 93¾%.

Our work confirms the work of others: that blood transfusion is a definite aid to the recovery of animals affected with anaplasmosis.

References

1. Boynton, W. H., Further observations on anaplasmosis. *Cor. Vet.*, 22:1, pp. 10-28, 1932.
2. Boynton, W. H., University of California, Berkeley. Personal communication, April 16, 1943.
3. Cuilli, J., and Darraspen, E., Blood transfusions (intravenous and subcutaneous) in the treatment of anemias (trans. title). *Rev. Gen. Med. Vet.*, 29:453, pp. 513-530, 1929.
4. Farquharson, James, Department of Veterinary Surgery and Clinics, Colorado State College, Fort Collins. Personal communication, January 15, 1943.
5. Koger, R. B., Whole blood in the treatment of anaplasmosis. *Vet. Med.*, 36, pp. 316-318, 1941.
6. Lienhardt, H. F., Pyle, Chas. A., and Dykstra, R. R., Anaplasmosis investigations. Department of Vet. Pathology Kansas State College, Manhattan. June 30, 1934.
7. Lundy, I. S., Touhy, E. B., and Adams, T., Proceedings, Staff Meetings, Mayo Clinics, Rochester, Minn., March 23, 1938.
8. Meads, E. W., Claremore, Oklahoma. Personal communication, December 29, 1942.
9. Rosenbusch, F., and Gonzalez, R., Anaplasmosis in Argentina. *Archiv. f. Protistenkunde*, 58, p. 300, 1927.
10. Smith, H. C., and Howell, D. E., The chemotherapy of 275 cases of anaplasmosis. *Vet. Med.*, 39:11, pp. 377-387.
11. Stiles, Geo. W., Anapalasmosis: a disease of cattle. 1942 Yearbook of Agriculture—Keeping Livestock Healthy, pp. 579-587.

Microbial Antagonisms and Antibiotic Substances

The recent discovery of the effectiveness of certain antibiotic substances produced by microorganisms, notably penicillin and tyrothricin, in treating various human and animal diseases has aroused intense interest in the whole field of microbial antagonisms.

The antagonistic interrelationships among microorganisms have attracted attention since the early days of bacteriology. Following the discovery by Pasteur that microbes are resonsible for certain human, animal, and plant diseases, it was established that other organisms, later designated as antagonists, are able to combat and even destroy the disease-producing agents. At first, the soil was believed to be the natural habitat of the bacteria that cause epidemics and disease as a whole but, after careful study, the fact was definitely established that very few of these bacteria survive long in the soil. On the contrary, the soil was found to be the natural medium for the development of antagonists chiefly responsible for the destruction of pathogens.

The activities and potentialities of these antagonistic microbes still present many problems. The subject is extremely complicated, involving numerous interrelationships among different biological systems of both higher and lower forms of life.

Weekly "Salting" with Phenothiazine to Control Parasites

By R. T. HABERMANN*
Beltsville, Maryland

IT IS a common practice in some sections of the country for sheep and goat raisers to "salt" their animals at approximately weekly intervals. The good results that have been achieved in parasite control by the continuous free-choice administration of phenothiazine in salt suggested the possibility that a suitable mixture of this drug with salt might provide effective control of parasites if it were used in lieu of plain salt for the weekly "salting". Sheep were not available for testing this hypothesis, but a preliminary experiment was set up with a small herd of goats. The procedure followed and results obtained are described in the present report.

Methods

These observations, covering a period from April 27, 1943 to September 16, 1944, were made on 14 goats and 28 kids of mixed breed, all maintained by the Zoological Division at the Beltsville Research Center, Beltsville, Maryland. At the beginning of the test the herd was divided into two main groups. Group I consisted of seven does, the ages of which ranged from two to five years, and five kids. Group II consisted of six does, the ages of which ranged from two to five years, and five kids. Three male kids, Nos. 273, 274, and 275, and a 4-year old billy, No. 90, on which some control observations were made, were put in a third group. April 4, 1944, three male kids, Nos. 232, 259, and 260, were taken out of group I and added to group III in order to keep the sexes separate. Five kids in group I and 10 kids in group II, born during the test (1944), were also studied.

A preliminary test to determine the quantity of salt consumed by the goats in group I in one day, when offered at weekly intervals, was begun April 30, 1943. These tests showed that the animals consumed about 250 grams of salt and, since a greater concentration of phenothiazine was thought to be necessary in a salt mixture offered at weekly intervals than in one offered for daily consumption, a 1:7 phenothiazine and salt mixture was tried. May 24, 1943, this group was offered its first treatment with medicated salt—one part of salt and seven parts of phenothiazine—added to one pound of grain. The quantity of the mixture offered each week to the goats in group I varied from 245 grams of salt and 35 grams of phenothiazine to 385 grams of salt and 55 grams of phenothiazine. April 30, 1943, the goats in group II were offered, free choice, a 1:10 phenothiazine and salt mixture plus a couple of handfuls of grain. This group was maintained thereafter on a regimen of continuous self-medication.

Each group was confined to a ½-acre pasture and fed a liberal amount of alfalfa hay to supplement the grass available on the pasture. The animals in group III were used mainly to keep the brush and weeds on the farm cleaned up; they were not given any supplementary feed but were moved to a new lot whenever their forage became scarce. No anthelmintic treatments were given to the goats in group III except to goat 90 which became heavily parasitized and, in order to save the animal's life, was treated with 20 grams of phenothiazine on August 12, 1943.

Fecal pellets were collected from the individual goats of groups I and II at more or less regular intervals for the purpose of making total egg counts and differential determinations of the species of worms present. The egg counts were made by Dr. D. A. Shorb, whose assistance the author acknowledges with appreciation. Salt flotation examinations of the eggs of nematode parasites in the male foraging animals of group III were made only at such times as seemed desirable to compare the infections of these animals with those of the animals in groups I and II. Observations were made daily of the condition of all the animals.

TABLE I.—AVERAGE MONTHLY EGG COUNTS OF HAEMONCHUS AND TRICHOSTRONGYLUS IN GOATS CONSUMING A PHENOTHIAZINE SALT MIXTURE

	Group I (weekly [1])		Group II (continuous [2])	
Month	Haemonchus	Trichostrongylus	Haemonchus	Trichostrongylus
May, 1943	265	8	47	9
June, 1943	84	12	20	3
July, 1943	123	29	17	14
August, 1943	134	91	95	11
September, 1943	164	140	26	38
October, 1943	62	170	68	78
November, 1943	30	256	24	84
July, 1944	2	12	12	80

[1] One part of phenothiazine to 7 parts of salt.
[2] One part of phenothiazine to 10 parts of salt.

* Zoological Division, Bureau of Animal Industry, Agricultural Research Administration, United States Department of Agriculture.

The technic for recovering and enumerating worms at necropsy consisted of taking small samples of the mixed contents and scrapings of the stomach and small intestines and examining each of them with a dissecting microscope for Trichostrongylus, Cooperia and Strongyloides. The larger worms were recovered by screening the contents of the gastrointestinal tract and by manual removal of the worms from the mucosa.

Observations

The monthly averages of Haemonchus and Trichostrongylus eggs for the goats in groups I and II are shown in table I. It will be noted that the group II goats, receiving continuously the 1:10 phenothiazine and salt mixture, passed small numbers of nematode eggs throughout the test. The goats of group I, receiving the 1:7 medicated salt mixture at weekly intervals, passed a somewhat larger number of eggs per animal until November 1943 when they lost their infections. The egg counts on the individual animals in group I were not consistently either high or low. Some of the animals did not eat the 1:7 phenothiazine-salt mixture when it was offered each week, but ate a proportionately larger amount of it every other week or every third week. Thereafter the egg counts dropped considerably (table II), indicating that the goats were protected from heavy or serious parasitism by more or less adequate anthelmintic medication every two or three weeks. However, two kids died while on the 1:7 phenothiazine and salt medication. One of these, No. 252, was found dead on August 2, 1943. Two weeks prior to her death she had had a diarrhea and a high coccidial oocyst count. Upon necropsy, 680 mature and several hundred immature specimens of *Haemonchus contortus*, a few Ostertagia, hundreds of *Trichostrongylus colubriformis*, hundreds of Nematodirus spp., and 136 *Trichuris ovis* were found. The other, No. 251, had not been eating well for about a week, then developed diarrhea and two days later, December 15, 1943, died. An egg count on one pellet of feces from this animal showed 1950 eggs of Trichostrongylus, 127 of Nematodirus and two of Trichuris. One of the kids, born during the course of the test, was found dead on February 26, 1944, and upon examination was found to be very heavily infested with biting lice, *Bovicola caprae*. Thereupon, all the goats and kids in group I were dusted with one of the following powders: Sodium fluoride, DDT, and equal parts of phenoxathiin and talc. The last two treatments were selected for purely experimental reasons and it may be stated, parenthetically, that the results were wholly satisfactory; there were no further evidences of lousiness and no more losses.

During the 63 weeks that the goats of group I were treated weekly with the 1:7 phenothiazine and salt mixture, the herd consumed 2,720 grams of phenothiazine and 19,040 grams of salt, an average weekly consumption per animal of 3.60gm of phenothiazine and 25.19gm of salt. The animals in group II consumed free choice, 3,500 grams of the 1:10 phenothiazine salt mixture. This amounted to an approximate average daily consumption of 0.589gm of phenothiazine and 5.89gm of salt per animal during the 457 days of the test.

TABLE II.—NUMBERS OF EGGS OF HAEMONCHUS AND TRICHOSTRONGYLUS PER PELLET OF FECES OF GOATS NOS. 115 AND 175 IN GROUP I. (WEEKLY "SALTING")

Month	Goat 115 (6 yrs. old) Haemonchus	Goat 115 (6 yrs. old) Tricho-strongylus	Goat 175 (3 yrs. old) Haemonchus	Goat 175 (3 yrs. old) Tricho-strongylus
May 22, 1943...	317	26	175	8
May 28, 1943...	66	14	405	7
June 4, 1943...	0	1	259	42
June 12, 1943...	5	13	197	12
June 19, 1943...	8	34	146	10
June 25, 1943...	33	27	526	21
July 10, 1943...	862	10	6	59
July 17, 1943...	0	9	707	23
July 24, 1943...	4	12	487	57
July 31, 1943...	3	27	427	71
Aug 9, 1943...	59	24	461	101
Aug. 14, 1943...	11	8	565	119
Aug. 21, 1943...	0	3	174	80
Aug. 28, 1943...	2	9	347	258
Sept. 3, 1943...	20	26	3800	1750
Sept. 11, 1943...	12	16	22	49
Sept. 18, 1943...	26	24	61	61
Oct. 16, 1943...	10	27	123	38
Nov. 15, 1943...	6	24	24	12
June 26, 1944...	0	10	0	8

Since the egg counts on the animals in groups I and II indicated that both of the groups were lightly infected, it was decided to necropsy only the goats receiving the weekly treatments of phenothiazine and salt and the untreated goats. The pertinent data and necropsy findings on the goats in groups I and III are shown in Tables III and IV. It will be noted that the untreated animals harbored many more worms than those that had received the weekly treatments with medicated salt. The total numbers of Haemonchus, Bunostomum, *Oesophagostomum columbianum* and *O. venulosum* were 3,770, 88, 106, and 512, respectively, from the seven goats in group III and only 322, 0, 0, and 11, respectively, from those 10 in group I. Two of the kids in the treated group had many trichostrongyles, but only one in the untreated group was heavily infected with these worms. The number of whipworms found in the goats of group I was nine and in those of group III, one. The general health, conformation and condition of the animals appeared superior in the goats receiving the weekly treatments; no deleteri-

ous effects due to the drug were detected in the intestinal tract or other organs of these animals.

Discussion

The data given herein are plainly more suggestive than conclusive, but it is believed that some sheep or goat raisers who are confronted with problems of parasitism might undertake with profit a cautious trial of a regimen of treatment like that described in this note. The system will undoubtedly be limited to goats and sheep on the range and to herds and flocks that are usually salted at weekly intervals. There is nothing in the above findings to indicate that the regimen is superior in any respect to the method of continuous administration of phenothiazine in salt. Phenothiazine and salt mixtures, however, have been chiefly effective in controlling the parasites of goats and sheep when the latter were maintained in confined areas, when they were given therapeutic doses of phenothiazine during the winter months and when they were subsequently placed on pastures that had been idle over the winter. Generally, it is neither practicable nor necessary to maintain range animals on continuous self-medication, since moving the salt boxes each day to keep pace with the animals would be a laborious task, and the number of infective larvae picked up on the range is generally less than the number picked up on permanent pastures.

Since the pasture where the animals were given the weekly 1:7 phenothiazine and salt was heavily seeded with parasite larvae, as shown by the egg counts and by the deaths of two of the kids from parasitism, this preliminary experiment suggests that weekly "salting" with suitable mixtures of phenothiazine and salt may have merit as a practicable means of controlling parasites of ruminants on the range.

The weekly average consumption of phenothiazine per animal was about equal to the total quantity of drug consumed each week by one animal kept continuously on a 1:10 mixture. The advantage to the goats of consuming from five to 10 grams of the drug during one day is that an anthelmintic effect is attained with the result that some of the worms are removed at intervals of one to three weeks. This would compensate to a large extent for loss of the inhibitive effect on the development of parasite larvae in the feces of sheep and goats that are receiving medicated salt continuously. It appears, moreover, that for range animals, which are on the move, this factor may not be so important as is the partial removal of the worms every two or three weeks.

Two kids, twins, died from parasitism during the test. They may have been more susceptible to parasites than the others in the herd or they may not have eaten enough of the mixture. In either case, this experience indicates that goats should be watched and whenever individual animals are not doing well because of parasitism they should be

TABLE III.—WORMS RECOVERED AT NECROPSY FROM THE DOES OF GROUP I (TREATED WEEKLY WITH PHENOTHIAZINE AND SALT MIXTURE, ONE TO SEVEN)

Goat	Date	Age	Weight	Haemonchus	Ostertagia	Trichostrongylus	Bunostomum	Oesophagostomum columbianum	Oesophagostomum venulosum
(no.)	(1944)	(yrs.)	(lbs.)	(no.)	(no.)	(no.)	(no.)	(no.)	(no.)
111	Sept. 5	6	60.0	63	100	few	0	0	1
115	Sept. 5	6	57.0	163	25	few	0	0	2
431	Sept. 6	5	61.0	20	0	few	0	0	3
261	Sept. 6	2	37.5	18	0	few	0	0	2
432	Sept. 7	5	71.0	3	15	0	0	0	0
175	Sept. 7	3	67.0	15	0	0	0	0	0
110	Sept. 8	5	55.0	0	0	few	0	0	1
304	Sept. 8	7 mos.	37.0	0	5	many	0	0	2
302	Sept. 9	7 mos.	30.0	15	50	many	0	0	0
305	Sept. 9	7 mos.	40.0	35	200	few	0	0	0
Total				332	395				11

TABLE IV.—WORMS RECOVERED AT NECROPSY FROM THE MALE GOATS OF GROUP III (UNTREATED)

Goat	Date	Age	Weight	Haemonchus	Ostertagia	Trichostrongylus	Bunostomum	Oesophagostomum columbianum	Oesophagostomum venulosum
(no.)	(1944)	(yrs.)	(lbs.)	(no.)	(no.)	(no.)	(no.)	(no.)	(no.)
90	Sept. 12	5	68.5	1,000	0	few	69	61	41
273	Sept. 14	2	48.0	150	50	few	1	8	52
259	Sept. 14	3	67.0	thousands	100	few	11	5	78
232	Sept. 15	3	65.0	400	200	few	1	0	28
260	Sept. 16	2	54.0	135	50	few	0	13	54
275	Sept. 16	2	38.0	thousands	200	many	5	19	211
274	Sept. 16	2	43.0	85	0	few	1	0	48
Total				3770+	600		88	106	512

given therapeutic treatments. Also the goats in group I were not offered the 1:7 phenothiazine and salt mixture until May 24, 1943, and the number of parasites picked up, as well as the increase in the contamination of the pasture by that time, may have lowered their vitality to such an extent that the weekly treatments were not able to overcome the damage already done. It is probable that the egg counts in the group I goats would have been lower if "salting" with the 1:7 mixture had been begun at the same time as those receiving the free choice 1:10 salt mixture.

The weekly cost of phenothiazine, in a 1:7 phenothiazine and salt mixture, offered to goats at weekly intervals is about 0.8 cent per goat. This figure was determined by assuming the cost of phenothiazine to be $1.00 per pound and that 126 animals, each eating 3.6gm of phenothiazine per week, would consume one pound of the drug. Assuming that animals on the range would probably require about 20 treatments during the grazing season, May through September, the cost of the phenothiazine for treating one goat for five months would be about 16 cents. The salt would cost about one cent.

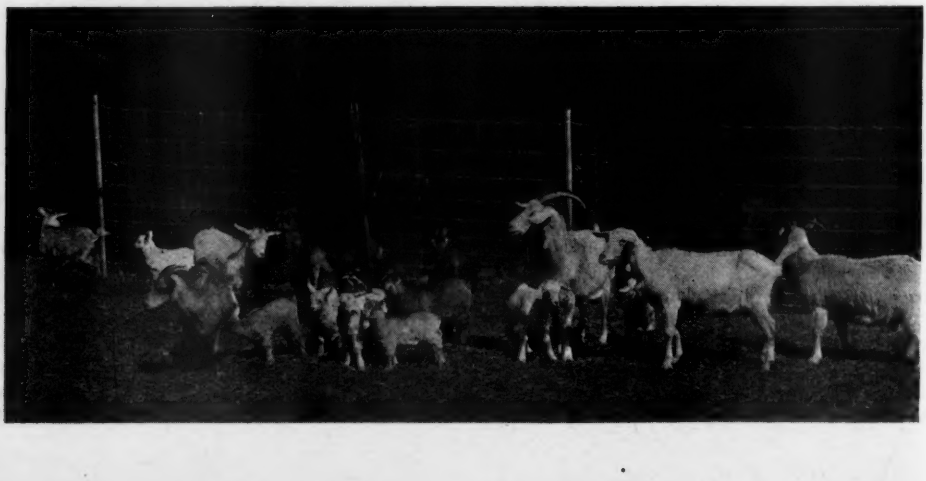
Abstract—Summary

Three groups of goats, consisting of 14 mature animals and 28 kids, were employed in tests to determine the efficacy of a 1:7 phenothiazine and salt mixture offered at weekly intervals, as a measure for controlling internal parasites. The observations covered a period from April 27, 1943, to September 16, 1944, and the results were judged by periodic egg counts and worm counts at necropsy. In addition to the principal group, one group of controls was maintained on the regimen of free-choice, continuous administration of phenothiazine and salt, 1:10, and a third group was left untreated.

The nematode egg counts of the animals on the weekly salting regimen were not so consistently low as the egg counts of those receiving the 1:10 phenothiazine and salt "free choice," but both methods were effective in protecting the animals from gross parasitism. The irregular periods of high and low egg counts of the goats on the weekly salting regimen were presumed to be due to their habit of consuming from five to 10 grams of phenothiazine every second or third week, resulting in periodic removal of their nematodes. The average weekly consumption of the 1:7 phenothiazine salt mixture was 28.79gm per animal and the cost of the treatment for one animal through the grazing season, May through September, was estimated to be about 17 cents.

Since the animals on the weekly "salting" and those on the "free choice" phenothiazine-salt mixtures were both lightly infected at the termination of the test, only the goats on the weekly salting regimen, and the untreated goats, were autopsied. The total numbers of Haemonchus, Bunostomum, *Oesophagostomum columbianum* and *O. venulosum* were 3,770+, 88, 106 and 512 respectively, recovered from seven of the control goats, and only 322, 0, 0, and 11 respectively, from the animals given the weekly treatments. The general health and condition of the treated animals was good; no deleterious effects due to the drug were detected in the intestinal tract or other organs of these animals.

It was concluded that a 1:7 mixture of phenothiazine and salt, with some grain, offered to goats each week possesses promise of being a practicable procedure for controlling the internal parasites of goats, and possibly of being effective in controlling gastrointestinal parasites of both goats and sheep on the range.



Sexual Hormones in the Treatment of Prostatitis and Neoplasms of Aged Dogs*

By C. HERMAN BECKMAN
4411 Chippewa St.
Saint Louis, Missouri

THE treatment of tumors of the reproductive organs of aged males with natural, water soluble ovarian hormone, constitutes a safe, convenient and effective method of dealing with this type of neoplasm in the dog. It is logical, since the orchic substance or testicular hormone is successful in the treatment of mammary tumors, that ovarian substance should be effective in analogous conditions in the male. This reasoning is borne out by the successful treatment of the male affected by new growths of the genital organs which are associated with infirmities of age.

Treatment by various methods and various types of hormones proved that natural, water-soluble ovarian substance gave the best results. Even when castration had been resorted to, the preliminary use of ovarian substance proved of great value, reducing the surgical risk to a minimum. Before the use of ovarian substance in aged, male animals affected with prostatitis and neoplasms associated with the sex organs, these cases were castrated with promising results. However, this surgical interference constituted a severe risk for animals already in a precarious condition. If the patient survived, the results were permanent, but a bit slow. They were also minus the collateral beneficial effects that have ensued from the use of natural ovarian substance, i.e., the relief of the premature senility.

The castration formerly employed need not be described. It was simply the usual operation which was performed under local anesthesia.

The agent employed in the cases here described is a natural, water-soluble, fat-free extract derived from 2.5gm of fresh ovarian tissue per cubic centimeter of extract. No method of standardization of the extract was employed. It has been my experience that this natural ovarian hormone is many times more potent and effective than the natural water soluble orchic substance derived from 10gm of fresh testicular substance, which is used in the treatment of mammary tumors of the female and which was described in an earlier article.[1] Therefore a smaller dose may be given. However, the tolerance for very large dosage is illustrated by the case reports which follow. Dogs have been given up to 1cc of natural, water-soluble ovarian substance per pound body weight with only minor disturbances. One milligram of stilbestrol per pound of body weight has also been given subcutaneously with only minor reaction.

The time interval between doses may vary. In the beginning of this experiment, the interval between doses of the hormone was 10 days to two weeks, when given in conjunction with daily doses of one to 5mg of stilbestrol. The ovarian hormone was given subcutaneously and the stilbestrol orally. In some cases, dessicated whole ovary in capsules was substituted for the stilbestrol. It was found by trial that the patient tolerated larger doses at shorter intervals so injections were made a week apart. Later, in some cases, a large initial dose of 1cc per pound of body weight was followed by a daily dose of one-fourth this amount. This gave quicker results.

Treatment in the male is usually sought later in the development of the neoplasms, than in the female. This is due to the fact these tumors in the male are not visible to the owner until they attain a rather large size. In the female recognition is usually very early in the involvement of the mammary structure. Many male dogs five years of age have neoplasms of the prostate and of the seminal vesicles. In older dogs they are, of course, more common.[2] Due to delayed diagnosis, treatment is usually commenced at a very late period—the neoplasms being quite advanced. The results in these advanced cases

[1] Beckman, Herman C., Sexual hormones in the treatment of mammary tumors in aged bitches. *Vet. Med.* 40:1, pp. 20-23, 1945.
[2] Whitney, Leon F., Neoplasms in the dog. *Vet. Med.* 40:1, p. 19, 1945.

are not so good as when treatment is undertaken earlier.

In the male the same incidental results are obtained in the use of natural, water-soluble ovarian substance as in the female with the natural, water-soluble orchic substance—improved vision, disappearance of anemia, improvement in arteriosclerosis and relieved asthma, when these ailments are a result of the premature infirmities of age. Over-sexed males are toned down by injections of natural, water-soluble ovarian substance, or by stilbestrol. Copulation and impregnation are not interfered with by the hormone treatment as several treated animals were used at stud successfully. In this respect, also, the injection of ovarian substance is superior to castration since valuable breeding stock, afflicted with neoplasms, may be preserved for procreation. The extract is convenient to administer by giving the hormone hypodermically and the supportive treatment orally. Symptomatic, supportive treatment should be given in all cases.

Perineal Hernia

This may be either a unilateral or a bilateral condition. It is seen in male dogs ranging in age from four years upward. It is associated with neoplasm of the prostate gland and, in the more advanced cases of bilateral hernia, it involves, also, new growth of the seminal vesicles. The neoplasms of the prostate and seminal vesicles are located in the pelvic cavity, more posterior than anterior, and, naturally, cause the bulge posteriorly. They distort the rectum and fill the surrounding area with edematous and infiltrated tissue. In some cases a portion of the rectum may be everted and have the appearance of a polyp. This condition has been seen by the writer on two occasions. In one case in which the left seminal vesicle caused such a malformation, the classical surgical operation for perineal hernia resulted fatally; the other recovered from hormone treatment.

Having observed for a long time, that the male sex gland in the dog bears a direct causal relation to perineal hernia, I castrated all such cases for a number of years. Following castration the condition improved and gradual resorption of the neoplasms of the prostate gland and the seminal vesicles took place. This successful, though simple, operation for perineal hernia and the common failure of surgery as classically described, led to a comprehensive discussion of the subject with D. M. Campbell of Chicago at a meeting of the Illinois Veterinary Medical Association in 1937. Doctor Campbell stated that the operation was not new, as he had castrated male dogs for perineal hernia in his practice 20 to 25 years previously, and that he had preserved records of a number of such cases. Also that it had been published in VETERINARY MEDICINE only the year before[3] and also at an earlier date. This same procedure for the treatment of prostatitis in man has been heralded recently as a "new discovery" in the field of human medicine.

For the past several years I have been treating these perineal hernias by subcutaneous injections of natural ovarian hormone. The results have been much better than they were from castration. These patients are usually suffering from the group of ailments referred to as "infirmities of age," which includes anemia, arteriosclerosis, asthma and cataracts. These infirmities-of-age side effects are not relieved by castration. Further, as is well known, castration is not favored, where arteriosclerosis exists, nor does it rejuvenate the patient. The injection of the natural ovarian hormone, in much larger doses than those prescribed in the literature, has a remarkably beneficial effect in relieving these premature "infirmities of age," as is attested by the following clinical reports.

Case No. 1.—A 14-year-old, male German shepherd; weight 45 pounds; in very poor condition and of a very ugly disposition. He had cataracts, anemia, arteriosclerosis and a bilateral perineal hernia with a prolapse of the ventral floor of the rectum of the size of a tennis ball. This prolapse had been replaced by the owner many times, only to pop out again after a short time because of the straining, which becomes a habit in many cases of perineal hernia. Twenty cubic centimeters of natural ovarian hormone was injected in the subcutaneous tissue in the neck and six grains of nembutal was given by mouth. When the animal was relaxed the mass was replaced. Iodex suppositories were used in the rectum. Stilbestrol, 5mg orally, was given daily plus iron and copper, bile salts, urotropin and mineral oil. The prolapse recurred on the 4th day, but was easily replaced by the owner. No further eversion of the rectum occurred. Ten days after the first injection of 20cc of natural ovarian hormone, a second dose of 10cc was injected. The animal had gained 15 pounds in weight by this time; the hair coat and the general appearance were markedly improved. The 10cc-dose was inadequate, or I was expecting too much, for in another 10 days the patient seemed to have slipped. The bilateral swelling seemed slightly larger and the general condition had remained stationary. As a final effort, 30cc of natural ovarian hormone was given subcutaneously. Marked improvement in the general condition and a considerable reduction in the bilateral perineal hernia occurred promptly. The dog reached a weight of 85 pounds, nearly twice what it weighed when treatment began, and was full of energy. Surgery was suggested as a more economical procedure at this point. However,

[3] Quitman, E. L., Enlarged prostate relieved by castration. *Vet. Med.* 31:11, p. 457, 1936.

the owner was fearful of any surgical interference and insisted that the injections be continued. The daily dose of 5mg of stilbestrol orally was kept up, but due to financial considerations the hormone treatment was discontinued. At this time the obstruction to the passage of feces was apparently corrected and the perineal enlargement had almost entirely disappeared.

Eight months later, this case flared up anew;

the perineal enlargement being greater than originally, but the animal now filled its frame and weighed 110 pounds. This time stilbestrol, 1mg per pound of body weight, was given, subcutaneously, as the patient was out of hand and the owner desired quick results. A reaction occurred from this enormous dose, but in 36 hours all was well again and some improvement was evident. Two weeks later 90mg of stilbestrol was given intramuscularly. It was followed by a 24-hour reaction. Daily doses of 2mg stilbestrol, *per os,* were continued. In another two weeks 90mg of stilbestrol in oil was given intramuscularly, and this was again followed by a 24-hour reaction.

The results from the stilbestrol were not so good as from the natural ovarian hormone so, at the end of another two weeks, 30cc of the natural ovarian hormone was given and a very rapid reduction of the enlarged prostate and enlarged seminal vesicles occurred.

As soon as good results began to appear the owner failed to bring the animal in for observation and treatment and did not give the desired cooperation. Two months passed and the animal lost 30 pounds in weight and acquired a more aged appearance. Since I had failed to get the full cooperation from the client, I declined to treat the case further. Six months later a hemorrhage of the prostate terminated the animal's thoroughly miserable existence.

Case No. 2.—A 17-year-old, male fox terrier, weight 21 pounds, with bilateral perineal hernia, complete opacity of the crystalline lens (cataracts) in both eyes, but in fair flesh and condition. A 17cc-dose of natural ovarian hormone was given subcutaneously and 1mg of stilbestrol orally was prescribed. Seven days later, 12cc of natural ovarian hormone was injected. The stilbestrol *per os* was continued. Fifteen days after first injection, the cataracts had completely disappeared and the bilateral perineal hernia consisted of flabby skin only but no bulge. The dog had an enormous appetite, had gained four pounds in weight and was lively and full of "pep." Two weeks after the second dose a third dose of 5cc of ovarian hormone was given. Three weeks later a fourth dose of the same size was given and the case was dismissed; the hernia having disappeared.

Case No. 3.—A 4-year-old, large type fox terrier, weight 28 pounds, with a unilateral perineal hernia, but not showing the side effects, i.e., infirmities of age. Castration was performed and 5cc of ovarian hormone was given. This operation was a complete success in this case.

Case No. 4.—A Boston male, 10 years of age, classed as suffering from the infirmities of age and having a very pronounced perineal hernia. An examination of the prostate gland revealed a definite enlargement and jelly-like, edematous tissue surrounding the gland and filling the pelvic cavity. The general symptoms were cataracts of both eyes, asthma, anemia, arteriosclerosis, dry scaly skin, and temperature 101° F. The respiration and heart action were those common to infirmities of age.

The animal was fairly active, the impacted fecal mass was removed manually. Ovarian substance, 5cc, was injected subcutaneously. Supportive treatment, copper, iron and bile salts, hexamethylenamine and 1mg stilbestrol orally was prescribed to be given. Two weeks passed and a second 5cc of ovarian substance was administered. The impacted fecal mass, which continued to collect in the rectum, could now be evacuated by pressure at the sides of the mass or bulge. The jelly-like edematous material had been resorbed to the extent of 50% and the prostate was reduced in size. There was improvement in the general condition also. Eight days later a third dose of 5cc ovarian substance was given. There was no disturbance for four months, after which a slight flare-up occurred. A 10cc dose of ovarian substance was injected subcutaneously and 1mg stilbestrol daily was prescribed and the case dismissed. The animal is still alive and well after two years.

Case No. 5.—A Boston male, 17 years of age with severe cataracts, nystagmus, vertigo, emaciation and anemia. Euthanasia was suggested but rejected by the owner. Fifteen cubic centimeters of ovarian substance extract was given with full supportive treatment, including ice packs to the head, heat to the body, sodium salicylate 5gr, hexamethylenamine 5gr, copper and iron three times daily and bile salts twice daily. After 10 days the case had improved to such an extent it appeared to be a new animal. The dog could see to get around in strange places, had filled out, the hair coat was improved, he was active, the mucous membranes had a good color and there was a marked improvement in the arteriosclerosis. A second injection of ovarian substance was given and in two weeks the animal had improved to the extent that it was considered safe to extract all his infected teeth. The effect of the extraction of the teeth was, as expected, rather severe, but the general condition had improved so much that the risk was taken. After another two weeks 6cc of ovarian substance was injected and improvement was again shown. This animal is now 19 years old and looks and acts like an eight-year-old dog.

Detection and Effects of Improper Slaughter in Dressed Poultry

By H. D. PRITCHETT
Farmville, Virginia

THE modern concept of slaughter of any meat-producing animal which is used for human food has, for its objective, the extraction of as much blood from the body as is possible before death occurs and, for humane reasons, as rapidly as possible. In the case of poultry, if death occurs from "debraining" or decapitation, excessive quantities of blood may be retained within the circulatory system and the body tissues. This results also when the bird is put into the scalding vats too soon after sticking, thereby preventing adequate bleeding. Under these circumstances the bird therefore does not in fact die from hemorrhage, but from a combination of factors, all of which militate against the appearance and keeping qualities of the carcass.

This failure to bleed throughly is a serious defect in the preparation of dressed poultry for consumption at great distances from the dressing plant. Since blood is an ideal culture media for most saprophytic bacteria, and it is common knowledge that the body of any animal, alive or dead, contains multitudes of bacteria, which after death effect dissolution of the body the goal to strive for is the drainage of absolutely every drop of blood from the carcass. This is, of course, impossible.

In a previous paper[1] the writer attempted to define[2] the terms "cadaver" and "carcass" as they may be applied to the inspection of dressed poultry. An effort was made to present logical reasons for this proposed classification based on the etymological derivation of the words, usage in the literature and the writer's personal experience. An effort is now made to show cause why the term cadaver should be a part of the nomenclature of scientific poultry inspection and what types of dressed birds and conditions operate to induce labeling a bird as a cadaver. Therefore, the primary concern of the paper in hand will evolve around the cause-and-effect phases constituting classification of a dressed bird in these categories and, for these purposes, there are two types of dressed birds reaching the markets classified as cadavers.

1. Healthy, vigorous birds upon which the slaughter wound was not inflicted to a depth sufficient to sever the carotid artery, jugular vein and vagus nerve, resulting in no appreciable degree of hemorrhage. The wound may have been improperly placed and, frequently, the spinal canal has been invaded by excessively vigorous application of the killing knife, resulting in division of the spinal cord. Since such an accident may be incidental in producing death too rapidly by complete removal of central nervous control, it is quite probable that undesirable quantities of blood are retained within the body as the direct result thereof. This is the type of cadaver most commonly seen and, in many cases, it is simply a manufacturing defect, due to carelessness in killing the bird. However, it is a serious condition, for reasons indicated.

2. Birds that have died of disease or asphyxiation, traumatism due to rough handling, exposure to cold and wet weather or over-heating, etc., are prepared, on occasion, to simulate legitimate slaughter by the infliction of a wound, followed by dressing by hand as such birds do not survive the mechanical buffer in a marketable condition. Birds at the point of death due to some of these factors are also occasionally processed and prepared for food.

Healthy birds upon which customary slaughter has been attempted, while being cadavers *per se*, are in many instances entirely edible and wholesome for human consumption, provided the birds are properly refrigerated and are processed promptly after dressing. The fact that a large quantity of blood is retained within the bodies of these otherwise healthy birds does not render them unfit for food, provided of course that the just-mentioned precautions are observed. But such birds, as a rule, do not present a delectable appearance and, for this reason, are probably almost unsalable "in the round" in the majority of

[1] Pritchett, H. D. The terms "cadaver" and "carcass" in dressed poultry inspection. *J. A. V. M. A.*, 105:5, p. 294, 1944.

[2] Cadaver: The body of an animal that has died of disease or other natural cause or from accidental injury. Only in an illicit manner do such bodies enter the trade channels of human food. Legitimate disposal requires that the cadaver be processed for animal feed, inedible fat, glue, bone meal, fertilizer, etc., burned or buried.

Carcass: The body of an animal that has been killed and bled for human food under approved practices. "Carcass" is properly applied to the body either before or after evisceration and removal of inedible parts.

cases. Commercial packers of dressed poultry should locate suitable sources of local distribution of these edible birds for immediate consumption. It is needless to mention that such packers would do well to acquaint themselves with their local laws and ordinances regarding such types of food. Under no circumstances should birds falling in the No. 1 classification be exposed to prolonged transportation, because deterioration is extremely rapid, even under the usual conditions and methods of refrigeration while in transit. The majority of these birds should never leave the packing plant, as they will very likely be undergoing decomposition by the time they reach their destination.

The factors which operate to bring about the classification of cadaver are manifold and somewhat complex, but an accurate diagnosis, based on technical knowledge, can be made. However, as a precautionary measure, persons attempting such diagnoses should be in a position to substantiate their charges in a court of law, otherwise, the differentiation will serve no constructive or useful purpose.

Birds classified as cadavers described in the No. 1 classification are characterized by acute engorgement of all visible superficial blood vessels, especially the jugular veins on either side of the neck, the external thoracic vein with its bifurcations traversing the breast and lateral aspect of the chest wall, and the radial veins in the wings. In such birds, these veins will usually be very prominent, especially the jugular and radial veins, and easily traced due to their bright red or black discoloration. In birds having heavy combs, wattles and ear lobes, cyanotic discoloration may be noted at or near the base of attachment. These same appendages may be engorged with blood. The oral mucous membranes may also present a cyanotic cast. The feather follicles are bright red giving the bird a pock-marked appearance, especially along the neck and over the back and thighs. Depending on the time and refrigeration, death is closely followed by alterations of the blood which appears bright red when fresh and black or very dark when the bird has not been properly refrigerated or has been dead for a period sufficient for augmented bacterial activity. Frequently, the skin presents a bright, fiery red discoloration in regions of the neck, wings and posterior abdomen. This red discoloration is probably due to hemolysis, with the resultant liberation of the hemoglobin which diffuses into the surrounding tissues. This condition is, no doubt, brought about by a combination of factors; possibly it is due to an increased concentration of katabolic products in the blood stream because of the slow asphyxiation which occurs in this type of defective slaughter, causing a condition to develop which results in the destruction of erythrocytes. On the other hand, activation of the already present bacteria by the elimination of phagocytosis may possibly induce or contribute to hemolysis. Another very important factor commonly occurring in water-cooled poultry is the introduction of sufficient water into the carcass via the natural body openings, to result in a radical change in the osmosis ratio of the individual cell walls and dilution of the normal body fluids, resulting in free transpiration of fluids into the blood vessels to effect a certain chemical end point. The liberation of free hemoglobin and dispersion by diapediasis would therefore appear quite possible. The terminal result is the cutaneous deposit of bright red pigmentation, which is often attributed to excessive scalding during the manufacturing process, and is said to be a post-mortem alteration directly due to heat. This is a very doubtful explanation, because this condition is observed instantly on emergence from the scalding vat under commercial conditions. This red discoloration must be differentiated from passive cutaneous hyperemia occurring in heavy fat fowl during life.

The quantity of meat produced in this country by chickens is more than four times as great as that produced by sheep.

In these cases, autopsy reveals the entire circulatory system and the parenchmatous organs and other viscera, especially the heart, engorged with coagulated blood. This type of dressed bird is probably the most troublesome and is much more frequently encountered than Type No. 2, which rarely finds its way into major commercial channels but on occasion reaches small retail dealers.

Being of only secondary interest to this paper, the bird classified as a cadaver under definition No. 2 needs no picturization beyond that already given, except to point out cardinal features upon which diagnosis is based. Birds dead of causes other than intentional slaughter are recognizable as such, provided they have not been extensively tampered with or dismembered. An inadequate ante-mortem slaughter wound may be present, or there may be no evidence of slaughter. If the pseudo-slaughter wound was inflicted after death of the bird, this can be detected

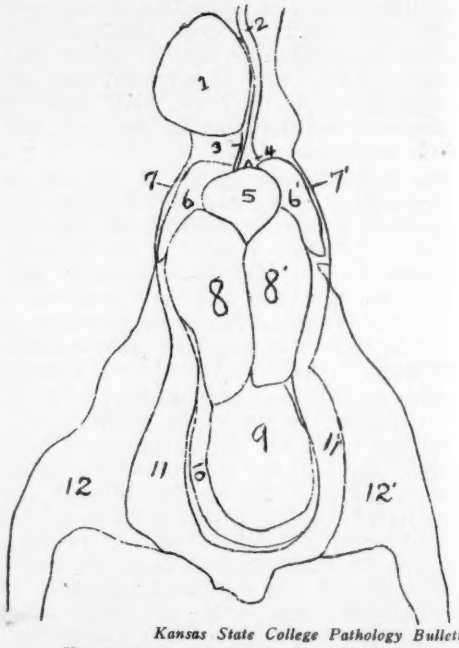
readily. When live tissue is incised hemorrhage occurs, varying according to the region of the body invaded and the depth and extent of the incision. Consequently, if there exists sufficient circulation to maintain even a so-called spark of life, some degree of hemorrhage of necessity occurs when the wound is inflicted. The margins of such a wound would show coagulated blood, possibly in only minute quantities yet easily descernible, and there would be slight, but readily apparent, red discoloration of the tissues immediately adjacent to the wound, caused by staining with hemoglobin and a stagnation of erythrocytes. Wounds inflicted in viable tissue usually gape slightly, and appear swollen due to contraction of the connective tissue and muscle fibers in the surrounding integument—an adaptation of nature to arrest hemorrhage from small, even microscopic, superficial blood vessels and to close portals of ingress for bacteria. This chain of events may be materially altered, when a diseased bird is slaughtered.

Should the slaughter wound be inflicted in the mouth, the wound presents a similar appearance and, almost invariably, blood can be seen in the mouth or expressed from the frontal sinus through the cleft in the hard palate. Frequently there occurs also inhalation of blood into the lungs. The bird may elevate its head in such a position as to permit deglutition of appreciable quantities of blood which will be found in the crop, where it has, in many cases undergone some degree of decomposition when the bird is eventually inspected. Although such blood in the crop would be black in color due to action of digestive juices, nevertheless it is one of the rare but unmistakable indications that the bird was alive when the slaughter wound was inflicted. If the bird was immersed in the scalding vats too soon after inflicting the slaughter wound, these indications would obviously be absent, but other criteria already mentioned would be in evidence.

Wounds inflicted after death to simulate legal slaughter present none of the characteristics above described but appear dry and free of blood and present an appearance similar to the surrounding muscles and skin. The wound would not gape open, as it would had the tissues been incised while in the live state. Mechanical distortion of the wound and surrounding tissues, especially when the neck cut is employed, must be differentiated; and when the mouth cut is employed, type and location of the wound will reveal unmistakable postmortem cutting.

Water cooling of the dressed poultry may materially alter the gross appearance of these wounds, due to cleaning. In such cases pathological alterations must be evaluated with great care and bacteriological and even chemical examinations may be required to satisfactorily establish the cause of death.

To summarize: Recognition of the cadaver is made possible by abnormal discoloration of



Kansas State College Pathology Bulletin

Viscera in situ of chicken. Ventral view
1. Ingluvius. 2. Trachea. 3. Esophagus. 4. Bronchi. 5. Heart. 6, 6¹ Lungs. 7, 7¹, 11, 11¹ Body wall. 8, 8¹ Right and left lobes of the liver. 9. Muscular stomach. 10. Duodenum. 12, 12¹ legs.

the tissue. Normal color of the carcass occurs in varying shades from a butter-like yellow, to pale shades of pink, and commonly a white or a near-anemic white, but never a grey-white corpse color. The difference between these shades and degrees of color is to a large extent dependent upon the breed, age, feeding practices, and general state of health at the time of slaughter and prior thereto, and to an appreciable extent may be due to dressing practices. The alternate application of the dressing operations commercially known as "hard scalding" and "plumping" in ice water may improve an undesirable color. Many acutely sick birds will dress out presenting abnormal colors. Therefore, birds presenting obviously abnormal discolorations of the skin and appendages are either acutely sick or were convalescing at the time of slaughter.

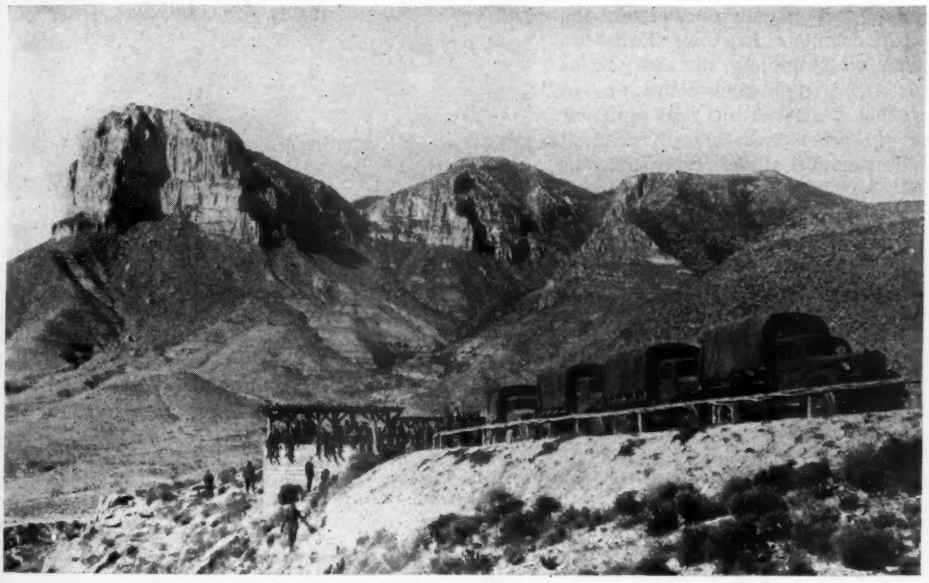
Experiences in Army Veterinary Service

VETERINARY officers are with all contingents of our Army and of course are stationed in all parts of the globe. Conditions are such that few of them are recording any of their experiences for publication. The following account of the movement of a mobile veterinary section of the British Army from the Middle East to Italy may detail almost equally well experiences of American veterinary officers and enlisted personnel in some of their transfers to Italy where a large number are now stationed with the American forces and with the Italian civil government.

Back to Europe*

Most of us in this mobile veterinary section had served so long in Syria that we were beginning to consider ourselves almost a composite part of that country and, in particular, of that peaceful and quite beautiful Valley of the Lebanon in which we were stationed for so long. The local inhabitants, at least, received a shock when we moved, and several of the syces who had been for so long employed by us were embarrassingly demonstrative—some to the point of tears. But in war nothing is permanent, and after weeks of rumor and counter-rumor, the day came when we had to say good-bye to those cool hills and green valleys of the Bek'aa.

And so at last as the rays of the sun heralded the birth of another brilliant day, we set out on the first part of our long and arduous journey. Some of us left without a thought for the country we were leaving, others had been there long enough to form an attachment for the place, but for the bulk of us it was with something like sadness that we left. From my own point of view, it was with mixed feelings that I watched the hills and villages that I knew so well over the past two years or so pass away into the distance. Just before we started I stood at the gate at the bottom of the yard and watched for the last time the slow procession of Arab men and women, horses, donkeys and goats file down from the little hillside village nearby, bound for another day in the fields. No more would this daily scene, so typical of the place, be observed by us.



"Along high winding roads of the mountains, thousands of feet above sea level." Our own Southwest furnishes many a counterpart of the mountains and deserts of the Middle East described by the author

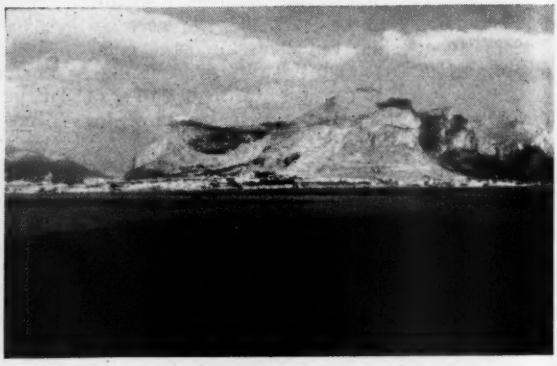
At length I took my place on top of the kit-piled lorry, which was to be my seat for the journey. We were off. I watched the Lebanon, with its miles of grape vines and olive trees, with its acres of waving grain, and its purple hills, pass by. This year we would not taste the grapes of the Lebanon, although before

*McGuire, R. A. V. C., Pvt. B. B., *Journal of the Royal Army Veterinary Corps*, 15:4, p. 84, 1944.

long we were to have our fill of grapes, but the grapes of an entirely different and far-distant land. No more would we hitch-hike down to Beirut for a week-end leave; no more would we ride up to a neighbouring village to pass the time of the day and drink coffee *a l'Arabe*. Gone was all that. Our journey took us, perhaps, through the most beautiful part of the Lebanon, along the high, winding roads of the mountains, many thousands of feet above sea level in some cases. Now and again a gap in the hills would afford us a wonderful panoramic view of the valley we had just left. As we went on, the hills became less sheer and their rocky austerity gave way to grassy slopes on which Arab herdsmen could be seen grazing large flocks of goats.

Almost imperceptibly we crossed the border into Palestine. It was strange to see again after so long the blue, sober uniforms of the Palestine Police, contrasting as they did with the rather swaggering French style uniforms of the Syrian Gendarmerie. It was strange, too, to see once more the Jewish colonists in their European clothes, walking along the dusty roads or driving along in their country carts. Yes, this was Palestine, and somehow even the atmosphere had changed; it was hotter and stuffier here than the valley we had left a few hours ago.

Along the dusty, winding roads of Northern Palestine we bowled, always descending, now with the snowy screen of Hermon, a wonderful vision, on our right. Then round a bend in the road came the first glimpse of the Sea of Galilee, the sun reflecting on its placid waters with a brilliance which hurt the eyes. It was just about three and a half years ago that the writer spent a peaceful five days' leave at the rest-house on its banks. To see the lake after so long gave me something of a thrill. Hotter and hotter it became as we descended to the level of the lake, until it became almost unbearable. The lake is about 600 feet below sea level and our road followed the southern shore of it. Naked Arab boys were swimming from the shore just off the spot where Capernaum once stood! Now only great blocks of masonry and ruined courtyards tell the former glories of its temple. Away out on the shimmering waters an Arab fishing boat bobbed lazily, its owner doubtless asleep. On a summit to our right stood a large monastery: could I remember the name of that hill? Yes, it was the Mount of the Beatitudes. At length, the road left the shore and we passed through the ancient town of Tiberias, with its old Crusader keep jutting out into the lake. The population was very cosmopolitan; both Jews and Arabs rubbed shoulders here, while now and again one caught a glimpse of the austere, black robes of a Jewish priest, usually elderly, with a long, flowing beard like the patriarchs of old, from whom they doubtless descended. We were now driving right through the very heart of Palestine. Past hundreds of Jewish settlements we went, with the blue-clad trousered girls working in the well-irrigated fields or among the trees of the orange and citrus groves. And then, like a scene from Hollywood transported to Palestine, we came upon the modern, almost futuristic, architecture of the white buildings of Tel-Aviv, mush-



Cliff Road, Amalfi Drive, south from Naples

room city of Palestine; with its modern white buildings gleaming in the afternoon sun, it seemed more like a stage-set from Hollywood than a city of the Near East. Smartly dressed Jewish men could be seen hurrying along, with their important-looking dispatch cases. Soldiers of all nations and of both sexes thronged the streets. The city seemed to epitomize Jewry, hurrying, scurrying, with an air of big business deals taking place all the time. Lucky inhabitants! So vastly different from their brothers and sisters of other countries in the chains of the Nazi yoke for so long. Yes, Jewry in Palestine is indeed fortunate. The Arab was a rarity in this city—he could never be at home there, anyhow. The call of the muezzin from the tower of the mosque just wouldn't fit in at Tel-Aviv.

At length, the last white house of the town was behind us, and for hour after hour we sped along dusty roads, running across endless plains. We spent the night just outside a Jewish settlement. At dawn the next day we were off again, and from that point onwards green things grew ever more sparsely,

the ground was baked as hard as iron, and we threw up clouds of choking dust as we went until we were all covered with a white coating. Very few Jews were to be seen, only black and ragged Arabs living in dirty villages of mud. This was Palestine, not the Palestine of fertile plots and modern houses, but the Palestine of the Arab. On and on we sped, all of us dusty, dirty and very thirsty. Mile after mile of hot, burning land passed by; villages that seemed white-hot faded into the miasma of our dust as we sped through them. The country was now almost all desert. At last with a huge red ball that was the sun sinking into the distance, we found the second night of our journey had brought us to the edge of the Sinai Desert.

I will not dwell on the run across Sinai, which we commenced at dawn the next day; most people who read this will know all about it, anyway. It is perhaps one of the hottest, dirtiest and most uncomfortable rides imaginable. Day after day the pitiless sun beats down. Round bends in the road, black-skinned gangs of fellahs were working to keep the ever-encroaching sand at bay. The green vales of the Lebanon were indeed a memory here. Strangely enough, the white glare from those hot sands kept bringing the vision of a little tinkling stream of ice-cold water that I knew of in Syria into my mind. Then when we were beginning to think that the desert would never end, suddenly in the far distance could be seen the strange sight of long lines of tall masts—Egyptian dhows on the Suez Canal—and soon a bit of verdure could be distinguished in the sand. At length, we found ourselves tooling along the banks of the Canal, and the next day found us in camp beside it. The first stage of our journey was over.

Kantara is not exactly a holiday resort, but in the two weeks or so that we spent there we did our best to try to get that impression. There was little to do, and we spent each afternoon swimming in the hot waters of the Canal. More than one of our number, with a thought to the future, learned to swim and we all got a magnificent tan. After about three weeks of this, things began to move and one day found us on H.T. ——— laden with mules and bound for strange lands, though most of us had a fair idea as to where. We called at Suez and stayed a night off Alexandria—whose port was a nautical dream, as almost every type of ship that ever sailed could be seen there. We anchored during the early afternoon, and a ladder was let down from the side while those of us who cared bathed for the last time in Egyptian waters. The comedy piece of the afternoon happened when a gaily dressed and very fashionable young Egyptian lady was knocked overboard from the poop of the little yacht in which she was sailing by a swing of the boom, caused by the unskilful handling of the craft by her swain. She was rescued, much bedraggled, by the sailors of an American sloop. When we awoke the next day we found that we were well out to sea. Our voyage passed without incident. We made landfall at dawn, and in a very short time mules, baggage and men were landed at a Sicilian port, the first sight of Europe for some of us for over four years.

Again came a period of waiting. Our little section was encamped in the very heart of a flourishing vineyard. From my "bivvy" I could reach out my hand and pluck a great bunch of black grapes. We ate grapes until we were tired of the sight of them. After a short time we again moved on and once more we found ourselves on dusty roads, no Arabs this time, though, but olive-skinned, war-weary Sicilians who waved to us from the villages we passed through. Each village, however small, had a tremendous church, which dwarfed the surrounding humble houses.

I will not dwell on our journey through Sicily. The picturesque coast road, the tragic ruins of towns where the Hun had put up a stand, the trip across the straits to the mainland, the same old tale of more ruined towns and villages, the refugees on the roads—these things do not make a pretty picture. Suffice it to say that one bleak October day we finally arrived at a spot on the Italian front, and for the first time in this campaign, and for a number of us for the very first time, we heard the sound of gun fire. The weather had set in with day after day of pouring rain. Conditions were foul in the extreme. Mechanical transport was useless, the mule companies were called forward, and the war, as far as we were concerned, had begun in earnest.

Never will I, or any of us in this section, forget that first memorable night when the gallant Indian mule companies went forward to commence the wonderful work they have done all through. We were camped in a river bed—perhaps I should say we were floating in it. Mud, thick, greasy mud of a particularly virulent type, abounded everywhere. We were talking in the lee of the bank when on the night air came the sound of hundreds of hooves crossing the wooden bridge which spanned the river. It was the mule companies going forward. It was an excitable, thrilling moment to think that animals were carrying on when other means of transport had become useless. It was a moment that gave one zest and an appetite for the work to be done.

It was a moment in which one forgave the mule all his faults. In effect it was the supreme moment of the mule and the muleteers —and lastly, but not least, the units of the R.A.V.C. [Royal Army Veterinary Corps], which kept them going, and are keeping them going at this very moment. What part the mules played in the battle will one day be told; it cannot be told here. It was an unforgettable sight to see a mule of an ambulance troop carrying its human burden of wounded to safety.

A little incident I can't forget happened while we were acting as escort to sick and injured animals being taken to hospital. We were going down and this particular chap of an armoured unit was going up. The convoy was held up, and his vehicle was stopped close to ours. He said "Mules? I didn't know they used them in this war." I replied, "You may take that back one day." He gave a derisive smile and we went on. By an amazing coincidence, I met him some time later—in charge of three mules.

As I am writing this, in the twilight of a cold, starry evening, a troop of heavily laden mules plod on, the muleteers stepping out briskly. On our sick lines are animals who have done their work and suffered for it. They will now undergo rest treatment and eventual cure.

"Mules? I didn't know they used them in this war."

* * * *

A Later Installment of McGuire's Experiences*

We have come a long way—a very long way indeed—since those early autumn days of last year, when the first R.A.V.C. units, the writer's amongst them, landed in Italy and commenced operations in this campaign. Yes, much has happened since then, and much muddy Italian water has flowed under many bridges, most of which, to our sorrow, are there no longer.

As I write this, the first rains for many weeks have fallen, not, we hope, an unhappy augury of things to come and, as I watch the familiar pattern of mules and men move across the evening skyline, I cannot help harking back to other scenes, other days, in other places which seem to form a tapestry—a tapestry of war, on which men and animals move on an ever-changing background; a background of blazing sun and dusty plains, of pouring rain and seas of mud, of dizzy peaks and snow-covered slopes; of ships and trains and trucks—but always men and animals. That is the tale this tapestry tells, the tale of horses, mules and men, which when told will make brave and interesting reading.

Who of those who took part in them can forget the grim treks across the burning, dusty plains of Upper Syria, in which each separate animal and man moved in his own private cloud of dust and flies. The camps by the side of the Euphrates, with rifle practice at the turtles sunning themselves on the opposite bank. Treks which took us across vast spaces of sun-baked earth, through villages whose houses were for all the world like clusters of beehives and, on passing Arab towns with barbaric names and fierce-looking inhabitants —Raqqa, Dier ez Zor, and many others—whose names will conjure up memories when we glance at a map in days to come and where, to leave one's rifle unattended for a moment was asking for trouble, and on across the frontier into Mesopotamia and to Baghdad.

But it was not always as grim as that. Lines of mules and horses drawn up in the peaceful and cool shadows of the groves of Baalbek, with the ruins of the Acropolis—the Temples of Bacchus and Venus—so much more perfect than anything even Rome can offer us, towering over all, is a picture a few of us will re-

Convalescent mules of the Fifth American Army in a pasture at a veterinary unit in Italy. Many horses and mules are required for transporting ammunition and supplies on the rugged Italian Front. These animals are frequent victims of land mines and occasionally they are wounded by shell and small arms fire

Signal Corps, U. S. Army

**The Journal of the Royal Army Veterinary Corps.* 16:1, 1944.

member. And for watering the animals there, what could be better than the cool springs of the Ras-el-Ain that flowed by the lines?

There are memories of treks from Palestine into Syria, down that famous Lebanese coast road littered with countless crumbling remains of once great towns of Biblical times—Tyre and Sidon—and little villages hugging the blue Mediterranean, with the sea on one side of the road and the tree-covered slopes of the Lebanon on the other. Who can forget the well-known camp sites on those particular journeys? The luxury of a swim after a day's dusty ride, a smoke, and later on in the evening the moonlit Mediterranean, a thing of beauty to behold.

Good work was done in those days, but it was really, we see now, only a prelude—a

Street scene in Dubrovnik—the streets of many of the European towns are extremely narrow

prelude to much harder and far more strenuous days, days in which the uttermost was demanded—and given. Big things occurred which are now history. The Middle Eastern scene, to which we had for so long been accustomed, changed for that of Europe. The hot days of early autumn of last year found us on Italian roads, thick with white powdery dust; that same dust, little though we guessed it at the time, was to make the name of R.A.V.C. units and the animals they handled quite famous in days to come, when the rains had turned it to mud with very peculiar vehicle-bogging qualities.

Came the rains: first the warm slight showers of autumn, and then long, persistent days of rain and sleet with icy winds that none of us who took part in the winter campaign will ever forget. With the rains came oceans of mud, which brought the mule companies and the R.A.V.C. units who kept them going into the limelight. The mule became a magic word in those days, with which unit quartermasters were able to extract much-needed gear from stores depots, the minions and guardians of which before politely but firmly stated that priority went elsewhere.

It was hats off to the mule and the muleteers then; hats off to the drivers and escorts of the R.A.V.C. and R.A.S.C. attached, who in all weathers and on all kinds and conditions of impossible roads, got through to the base hospitals with their loads of sick and injured animals, to return with fit. The supplies must go up, we were told. They did. Shades of days of almost regular hours and almost permanent stations in the Middle East! Shades of tropical skies and moonlit Mediterranean vistas! So many must have thought during that bitter winter. Heavily laden mules plodding through mud, sleet and blizzard, through shell and mortar fire, their weary Indian muleteers keeping on until they literally dropped. Lorry loads of mules usually arriving at R.A.V.C. field units at midnight, to be off-loaded immediately and trekked at dawn in vile weather to the outlying companies to fill the ever-increasing demands for replacements. Billets in broken-down barns over which Hun heavies whistled at night. Animals rescued and literally dragged under the very nose of the enemy, from river beds in pitch darkness, to be cured and used again.

That and much more is the tale our tapestry tells, and through it all, in all places out here, along winding, narrow mountain tracks and across green valleys where once must have travelled the pack trains and animals of Imperial Rome, our own mule companies and pack trains move today, with the men and field units of the Corps always in attendance. Are the winter battles the climax of our story? None can tell. But one thing we do know: if seas of mud confront us once again, and join hands with the enemy in his dirty work, and whenever supplies are needed upon almost inaccessible heights, then once again the mule will do its job—"the supplies will go up."

Clinical Reports

Acetonemia with Trismus

Acetonemia is not nearly so common in the section where I practice as it appears to be in some other sections, but I see enough of it to be keenly interested in its treatment, particularly in a treatment that will get the animals back to full milk production at the earliest possible moment. I have tried the vitamin A treatment, since Doctor Patton first reported it, sufficiently to satisfy myself that it is superior to any of the methods of treatment that I used previously.

I was called to a case in a six-year-old Jersey cow March 22, that later developed a symptom that was new to me. This cow was in thin flesh. All winter she had been on a ration of poor to medium timothy or timothy and clover hay and the usual grain ration, with no supplements. Her calf was three weeks of age.

It was about 8:00 p.m. when I saw her. She was somewhat unsteady on her feet, had an indifferent appetite, decreased milk flow, temperature 101° F., and the urine test for ketones was positive. The color reaction, however, was not deep.

At the time, my stock of vitamin A was exhausted and I gave the cow an intravenous injection of calcium gluconate and dextrose, thinking since the case was a mild one it would tide her over till a new supply of vitamin A was received. The next evening the owner telephoned me that he thought the cow looked better but that she couldn't eat at all.

I called the morning of the 24th, the vitamin A having been received. At this time the cow had as complete trismus as I have ever seen. The masseter muscles were contracted solidly and she was wholly unable to eat or drink. The temperature was 102° F. and the urine test for ketosis was strongly positive.

I administered 500,000 units of vitamin A. If anyone thinks that is easily done in a case of trismus such as this one, I recommend that he try it before making any bets. This treatment was repeated the following day and the next, except that the third time I used my head a little and gave the animal an intravenous injection of chloral hydrate which relaxed her jaws somewhat and made it easier to give the capsule. Vitamin A administration was continued two days longer and by that time the cow was eating and drinking and recovery followed.

The cause of this very stubborn attack of trismus and whether or not it bore any relation to the original ailment is a complete mystery to me. If the case had been a highly nervous one or if the animal had been excitable, I could understand the trismus for I have seen it as a complication of many and varied nervous conditions in cattle, but I have not seen it previously in animals that exhibited none of the other nervous symptoms so common in acetonemia. There was no sign of trismus on my first call. The owner blames the intravenous injection on the simple logic that the cow's jaws were not locked before the injection and they were afterwards.

H. L. MESSMORE

Altona, Ill.

* * * *

Comments on the Case of "Jamie"

The contribution "Some Interesting Animals I Have Known" on page 31 of January issue of VETERINARY MEDICINE, by Professor E. J. Frick, regarding the mare Jamie, along with the additional data supplied by Mr. Dan D. Casement in a personal letter provides some highly interesting and instructive facts regarding reproduction in horses which are applicable in principle to the problem of reproduction in mammals in general. During my career in the veterinary profession I have not personally known of a mare which has equalled the record of Jamie, with 17 live foals, the first of which was produced when she was eight years of age—one foal each year until and including 24 years of age. Numerous readers like Doctor Frick and myself are unfamiliar with such records in reproduction. Neither do we find frequent references to such performances in veterinary or animal husbandry literature.

Bernard v. Ottingen in his *Pferdesucht* (Horsebreeding), 1921, submits a list of 128 thoroughbred mares which produced living and valuable foals after they had reached old age. Many of this list produced foals after they had reached the age of 20 years, several of which bred after 24 years. Sister to Sampson produced 20 foals, one of which, when she was 26 years old, won important races. Look at Me Lads bore her first foal at 20, and her last at 33 years with a total of 12. A one-eyed mare, Sister of Silver, was used for riding and driving until 14 years old, after which she produced nine foals, the last one, like herself, one-eyed at 28 years.

V. Ottingen submits also a list of 213 thoroughbred mares, taken from the general studbook which had produced 17 or more foals

each, the highest number being 22. He adds a list of 30 mares in the celebrated Trakehnen stud, of which he was superintendent, which produced 17 or more foals each.

Unfortunately some important data regarding the breeding of Jamie are unavailable. Most of her breedings were "at pasture" so that the duration of pregnancy is unknown. Neither do we know the duration of intrauterine pregnancy of Jamie herself. In Table VII, page 90, of my Diseases of the Genital Organs of Domestic Animals, it is shown that in a small stud the breeding efficiency of mares increased as the duration of time they had been carried *in utero* decreased. This is in harmony with v. Ottingen's statement that in the Trakehnen stud, above mentioned, 16 of the highest producing stallions had an average duration of pregnancy of 333 days, and that the four individuals of the group having the lowest duration, were the most valuable as sires. One is accordingly justified in assuming that Jamies had a short intrauterine life.

In her first breeding year, Jamie was thrice bred at intervals of 21 days which would suggest ideally healthy "heat" cycles, and that quite possibly she was not responsible for the delay in conception.

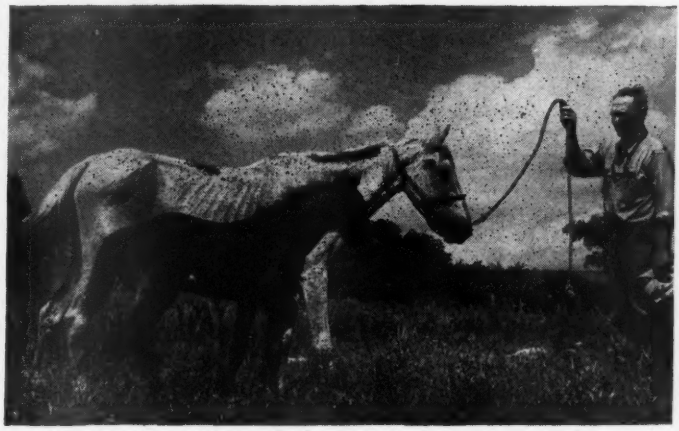
If we estimate the duration of gestation at 335 days (11 months) and tabulate them according to the intervals between successive foalings, some interesting data are revealed.

Number of Foal	Foaling date	Interval between foals in days	Sex of foal
1.	1928-6-29		Filly
2.	1929-5-30	336	Colt
3.	1930-4-30	335	Filly
4.	1931-6-30	426	Colt
5.	1932-5-31	336	Filly
6.	1933-5-11	345	Filly
7.	1934-4-28	352	Colt
8.	1935-5-12	379	Colt
9.	1936-6-9	392	Filly
10.	1937-5-21	347	Colt
11.	1938-6-12	386	Colt
12.	1939-5-31	385	Colt
13.	1940-6-9	374	Filly
14.	1941-5-27	353	Filly
15.	1942-6-5	374	Colt
16.	1943-6-16	376	Colt
17.	1944-6-8	357	Filly

If we estimate the highest physiological duration of pregnancy at 11 months (335 days) and add thereto nine days postparturient interval until the first heat period, it then becomes justifiable to conclude that of the 16 foals after the first, in which "pasture breeding" was practiced, it appears that three fillies (Nos. 3, 6 and 14) and 1 colt (No. 2) come within that group, while of those showing foaling intervals of 345 days or over there are four fillies (Nos. 9, 13, 14 and 17) and eight colts (Nos. 4, 7, 8, 10, 11, 12, 15 and 16). The foaling interval exceeded 1 year in 8 instances:

No. 4	426 days	Colt
No. 9	392 days	Filly
No. 11	386 days	Colt
No. 12	385 days	Colt
No. 8	379 days	Colt
No. 16	376 days	Colt
No. 13	374 days	Filly
No. 15	374 days	Colt

Colts 75%. Fillies 25%.



"Jamie" and her 17th foal. She foaled first at seven years of age and has produced a living foal each year since

The conclusion appears somewhat justifiable that a healthy mare like that under study, bred unsuccessfully on the ninth day will more probably produce a colt than a filly in a following pregnancy: that is, if bred on the ninth day an ovum is probably fertilized and perishes very early and its death and disintegration serve to injure the tubal mucosa or the endometrium. When this occurs, according to data available to me, there is a marked tendency toward an excessive ratio of males.

It is commonly believed by many that the reproductive efficiency of a mare is usually advanced by breeding the ninth day or first postparturient heat; just as many dairy husbandmen and veterinarians advocate the rebreeding of dairy cows at 30 to 50 days after calving or abortion. Despite the extraordinary productivity of the mare under discussion, and having been subjected to pasture breeding for 16 of the foals, in each of which ninth

day breeding presumably occurred, successful conception clearly occurred in but two instances in succession (Nos. 2 and 3). For the eight foals, Nos. 2 to 9, inclusive, the average foaling interval was 362.8 days, or 2.2 days less than one year, while for the foals Nos. 10 to 17, inclusive, the interval was 369 days or four days over one year. First bred at seven years, to foal at eight, she had just acquired her maximum degree of development and vigor and she had apparently begun to decline at 16 years.

Some apparently think that unless a mare be bred at first postpartum heat she can not foal annually. According to the data available to me, if a mare is ideally healthy her duration of pregnancy will drop below 335 days and her second estrual period—if not bred at first—will occur at 30 days postpartum. If then mated with a correspondingly healthy stallion she will probably foal after a pregnancy of less than 330 days, or a foaling interval of less than 360 days. By raising the vigor of the mare, the rapidity of growth and the vigor of the fetus is advanced.

The above citations to v. Ottingen regarding high reproductive efficiency in mares were in thoroughbreds. I am not aware of similar data being available for other breeds. Most of my crowded observations on horse breeding were upon the breeding of heavy draft horses, and I observed no such fecundity as that under discussion. In thoroughbreds virtually all animals of both sexes are excluded from reproduction until their fitness shall have been tested for the performance of the tasks for which their progeny is desired—they have been trained, raced, hunted, used as cow-horses, etc., etc. This eliminates the breeding of immature animals, and largely concentrates reproduction upon those individuals having the highest vigor. They are then used for reproduction only. In sharp contrast the dairy cow is asked to bear the triple load of grossly excessive lactation, the production of young, long before she has reached maturity, and the completion of her development. I do not recall an instance of a dairy cow having produced 20 or more calves but a client once regretfully remarked to me that he feared his leading shorthorn cow would produce no more calves. She had annually produced a blue-ribbon winner since first calving at three years and was now 24. Schmaltz, in his "Sexual Life of Domestic Animals" cites a polled Angus cow as having produced 25 calves. She was probably not bred when only half grown, was not asked to produce one calf each 11½ months or 50 pounds of milk testing 6% butterfat daily for 11 months each year.

Some readers may have wondered, that the mare under discussion should have produced 17 foals of unusual vigor after having been withheld from breeding until she was seven years of age. So many prominent teachers of dairy husbandry advocate the breeding of heifers at 15 to 20 months when but half mature and contend (without submitting data) that otherwise they are less fertile, that the opinion becomes common that reproduction in immature animals is desirable. Records where available contradict this teaching.

W. L. WILLIAMS

Ithaca, N. Y.

Small Animal Euthanasia

An ever increasing duty of the small animal practitioner is the safe and humane disposal of old and incurable cases. Sentiment and the lack of equipment prevent the laity from attempting such activities; leaving the entire field to the veterinarian, who should have a full knowledge of the precautions necessary, and the different methods available.

Selection of the Lethal Agent

When this operation is undertaken, a number of different facts should be taken into consideration. The most important of these are:

1. Speed: A method and substance should be used that will cause the death of the animal as quickly as possible.
2. Effect on the owner: Methods that produce pain and unwanted symptoms should be avoided.
3. Safety: Substances which cause the animal to become frantic endangering the operator or assistant are objectionable.
4. Cost: Expensive drugs, that make a high fee necessary, should be discountenanced in most cases.

These desiderata all must be considered, that the method decided upon may be effective and at the same time be the least objectionable.

Precautions

The first thing when an animal is brought to a hospital to be killed, is to get the written permission of the owner. A standard form should be used as a regular procedure in such cases. It should state that the animal belongs to the undersigned or that he is acting for the owner, and requests euthanasia for the animal. It should be signed by the owner, or a person of legal age acting for him. Always use the word euthanasia or kill—not destroy. It will prevent untoward accidents, when the owner merely wants an animal sex-

ually destroyed. The use of the aforementioned forms will serve a number of purposes, such as:

1. Relieves the veterinarian of responsibility.
2. Supplies the veterinarian with a permanent record.
3. Avoids orders by telephone.
4. Requires owner to be certain. He can't blame the veterinarian if he changes his mind later.

Lethal Agents

In administering euthanasia, a number of methods are available. Among those most widely used are:

1. Chloroform: This drug has probably had the most extensive use in this field. A variety of methods are available such as:

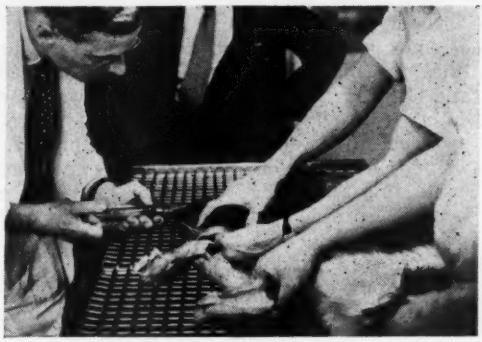
a. The bell jar: Place a small wad of cotton, soaked with chloroform under a jar where the animal is confined. Only small dogs and cats can be handled in this way. Due to the unfamiliar surroundings, the animal may become uneasy and try to escape, since the action is slow and often produces some unfavorable symptoms. The injection of a small amount of nembutal will quiet the animal and make more favorable results possible.

b. Intracardiac injection: Five to 10cc of chloroform injected into a chamber of the heart acts rapidly. The struggle produced is usually negligible. The success of the operation depends entirely upon the skill of the operator. Failure to deposit the chloroform within the ventricle produces symptoms which affect the owner unpleasantly.

c. Intramedullary injection: This has proved the most satisfactory method. From five to 10cc is the most practical dosage. To inject it, the animal's head must be depressed thus opening the occipito-atlantal joint. The opening in the vertebral axis at this point can be felt easily, and the needle inserted near the posterior margin, pointing downward and slightly forward until it enters the spinal canal. The escape of spinal fluid into the syringe will verify its proper position. The chloroform is then injected. Death is rapid—a short spasm followed by relaxation.

2. Magnesium sulfate: This is probably the least expensive of the lethal drugs. A saturated solution is injected either intravenously or into a ventricle of the heart. The magnesium ion disturbs the calcium-magnesium balance of the nervous system, causing acute depression of the nerve centers. There is no excitement. Therefore, the effect on the owner is favorable. An average dose is from five to 10cc.

3. Nembutal: This method ranks first in pleasing the owner. The animal suffers no pain whatsoever and merely goes to sleep. The injection of the drug is made in the same manner as for anesthesia, except a larger



Use of nembutal for euthansia by Dr. E. F. Schroeder, Angell Memorial Animal Hospital, Boston. Nembutal has been used almost exclusively for euthansia at this hospital for some years

amount is given. The minimum lethal does is 0.5gm per pound of body weight.

4. A lethal chamber: This is a very satisfactory way to dispose of an animal, but the expense of it is justified only where there is much use for it. One of its principal advantages is that one man can operate it. The chamber must be air tight and large enough to accommodate the larger breeds of dogs. There should be a glass window in the top or in one side, so that the operator can see the animal at all times. Cyanide gas or carbon monoxide are the substances of choice to use. Care must be taken with the former as it is dangerous to the operator.

5. Electrocution: The popularity of this method is growing fast. A simple way of electrocution is merely to put metal clamps on each wire of an ordinary electric light cord. To the other end of the cord is attached a regular light plug. One clamp is fastened to the skin on the back of the neck and the other to the tail. When these are firmly in place, the plug is inserted in a wall socket and death is instantaneous. More elaborate methods can be devised, but this is quite satisfactory. It has the drawback of being dangerous for the operator if carelessly employed.

R. F. GENTRY

Columbia, Mo.

Penicillin Therapy in a Case of Secondary Canine Distemper

Subject: Dachshund, eight months of age; weight 21 pounds.

History: The animal had been sick for seven or eight days, temperature 103.2° F., crepitant rales in both lungs, purulent eye discharge and fair appetite. The animal had shown some enteritis as evidenced by loose stools, but responded fairly well to a kaolin-pectin mixture. The dog had been on sulfapyridine, one tablet containing 7.7 grains, every four hours for a period of three days with no apparent improvement.

Diagnosis: Distemper.

Symptoms and therapy: 23 April 1945 it was decided to administer penicillin. The animal was given 10,000 Oxford units of penicillin intravenously at 10:00 a.m. This dosage was tolerated well with no untoward effects. The temperature at time of treatment was 102.8° F. and crepitant rales were still present in the lungs. At 3:00 p.m. the patient was given 10,000 units intramuscularly. At the time of this injection the animal showed some evidence of pain, which apparently was fleeting in nature. At this time the temperature had fallen to 101.6° F. There was no change in the pulmonary condition. With the exception of the momentary pain on administering the drug in the muscles there was no untoward effect noted.

At 10:00 p.m. a second intramuscular injection of 10,000 units was given, here again a fleeting moment of pain was noted upon administration. Temperature at this time had dropped to 100.5° F. The lungs were somewhat improved as evidenced by lessened crepitant rales. Appetite at this time was very good. The animal showed no limping or evidence of residual soreness from the previous intramuscular injection. From the time of the first intravenous injection of penicillin, all sulfa drug treatment had been discontinued. A cough mixture (cheracol) was the only additional treatment administered during the course of the penicillin therapy.

At 8:00 a.m. 24 April 1945 the patient was examined, the temperature was 101.0° F. and the lungs still gave evidence of congestion. The purulent discharge from the eyes had decreased greatly in amount. The dog was in better spirits and responded to food in quite a ravenous manner. At this time 10,000 units of penicillin was given intravenously. No untoward effects were noted.

At 2:00 p.m. the temperature was still normal and, with the exception of the conjunctival discharge and audible sounds of congestion of the lungs when examined with a stethoscope, the patient seemed in fairly good condition. It was decided to withhold all treatment except the cough mixture for 24 hours.

At 8:00 a.m. 25 April 1945 the patient was examined, the temperature was 102° F., the lungs were practically clear of congestion, the eye discharge was still present but scanty. An injection of 10,000 units of penicillin was given intramuscularly; again the momentary pain was noted upon administration. By 10:00 a.m. the temperature had dropped to 101.0° F. The appetite was very good. A loose, mucus exudate was being coughed up by the patient at infrequent intervals. At 3:00 p.m. the temperature was 101.2° F., 10,000 units were given intravenously with no untoward results noted. Good spirits were evidenced. At 5:00 p.m. the temperature was 103.4° F. but the animal seemed in good condition, this rise in temperature was attributed to a possible pyrogen reaction from the intravenous treatment at 3:00 p.m. We had been using a stock solution of penicillin in a 50cc container which was probably contaminated with pyrogens from previous use.

The dog was examined at 8:00 a.m. 27 April 1945 and the temperature was 101.8° F. The condition of the lungs had improved. Another 10,000 units of penicillin was given intramuscularly, pain again was exhibited upon administration. The temperature at 10:00 a.m. was 101.7° F. At 3:00 p.m. the temperature of the patient was 101.5° F. with no evidence of lung congestion; the eyes were still congested and there was a small amount of catarrhal exudate. In an effort to avoid the pain accompanying the intramuscular injection of the penicillin solution, 1½cc of a 2% solution of procaine was mixed with 20cc of penicillin solution. The animal was given 5,000 units of this mixture. Except for a twinge on entrance of the needle no discomfort was noted as had been the case in previous intramuscular injections.

On 28 April 1945 the patient was in very good spirits, with a good appetite, clear lungs, and the temperature 101.4° F. The temperature remained 101.4° to 101.5° F. all day. Medical treatment consisted only of cough syrup (cheracol), a teaspoonful every three to four hours.

The animal continued in good condition 29 April but still had a slight eye discharge, otherwise was without symptoms. The temperature was 101.1° F.

Recovery without complications or after effects followed.

Conclusions

While one case should not be considered a criterion it is believed that the use of penicillin in the secondary complications of distemper is worthy of further consideration and clinical trial. This particular case responded much faster to penicillin therapy than similar cases have responded to other methods of treatment in the past. Without a doubt the dosage of penicillin could be reduced according to the size of the patient and the severity and duration of the illness. It will require much clinical work to establish an even fairly accurate scale of penicillin dosage for small animals.

O. G. DAVIDSON

Kalamazoo, Mich.

An Atypical Case of Acetonemia

I have used vitamin A therapy in the treatment of 20 cases of acetonemia with excellent results in all save one. This case was clinically similar to the usual run of such cases and was not materially different symptomatically from others that responded to treatment promptly.

This was a five-year-old Ayrshire cow in good flesh and with a calf two weeks of age. She had been on a good ration of ample quantity. She had a typical attack of acetonemia March 15th. There were no observable complications.

I gave her 1,500,000 units of vitamin A the first day and left capsules and instructions for the owner to give her 250,000 twice daily for the next two days. By March 19th this cow was greatly improved. Her appetite was good and the milk flow was increasing. At this time I injected 400mg of vitamin B_1 and prescribed a pint of molasses on the feed, twice daily.

March 20th I was called to see this cow again. She had a staggering gait, a moderate muco-purulent nasal discharge, poor appetite and a much diminished milk flow. The urine test for ketones was even more intensely positive than when I had first seen her five days earlier.

I gave her 500,000 units of vitamin A and left capsules with the owner to continue this treatment. I also put her on chloral hydrate therapy. She improved right along and was reported normal in a week, and treatment was discontinued. I am at a loss to account for this relapse or second attack of acetonemia under a line of treatment that had been giving me complete satisfaction in similar cases.

F. A. LOMBARD

Troy, N. Y.

Abstracts

Effect of Testosterone on Dogs

Testosterone proprionate[55] given subcutaneously to growing puppies of both sexes for periods of six and 14 weeks produced effects which are well known in other species of animals. The androgen had little effect on the arterial blood pressure of the dogs.

The liver of each treated dog and the kidneys of the dogs treated for 14 weeks were enlarged by approximately 11 to 17%. The urinary bladders of the treated dogs were considerably enlarged, due probably to hypertrophy of smooth muscle. No effect of the androgen could be detected on the microscopic appearance of the renal juxtaglomerular tissue.—*H. J. M.*

Effect of Cooling on Wound Healing

Large and Heinbecker[51] carried out experiments on dogs to study the effects of prolonged refrigeration on wound healing. They determined the nature of the healing process in clean incised wounds of the skin and subcutaneous tissues of the forelimb after cooling to 6 C. for a period of twenty-four to seventy-two hours, using similar incisions in the opposite limb as controls. The healing process was studied by measurements of the tensile strength and by microscopic examination of the wounds at varying intervals. The results show that during the cooling period there is no reaction on the part of the tissues to the injury inflicted by the incision and that subsequently there is a definite lag in the healing of the wounds, the degree of delay varying with the duration of the cooling period. In wounds treated by delayed suture after cooling for twenty-four or forty-eight hours the incidence of infection is much greater than in control incisions maintained at normal temperatures. The results of these experiments, together with those of Bruneau and Heinbecker, indicate that harmful effects result from prolonged refrigeration of living tissue. It is felt, therefore, that refrigeration anesthesia is not ideal for amputations. Because of the increased incidence of wound infection after the cooling period shown to occur in the described experiments, it is recommended that wounds sustained on the

[55] Blackman, Thomas and Howard, The effect of testosterone proprionate on the arterial blood pressure, kidneys and urinary bladder and liver of growing dogs. *Bul.*, Johns Hopkins Hosp., 74, p. 321, 1944.

[51] Large, A., and Heinbecker, P. Effect of cooling on wound healing. *Am. J. of Surg.* 120, p. 727, 1944. Abst. in *J. Am. Med. Assn.*

battlefield should not be treated by refrigeration unless there is no hope of saving the part.

The experiments have a further bearing on veterinary medicine since wounds inflicted upon animals in severe winter weather are subject to refrigeration under natural conditions and treatment would appear to require protection from cold in addition to other therapeusis deemed applicable.

An Aid to Fertility

At the Michigan experiment station, Davis and Cole[42] found that, in mares, the ascorbic acid content of the blood was higher in good breeders than in poor breeders and the indicated reproductive function of a stallion was improved following injections of ascorbic acid.

Tuberculosis in Domestic Carnivora

A study of the literature and of cases examined by the authors[69] indicated that tuberculosis in the dog is most frequently due to human type bacilli, infection being by airborne organisms originating from tuberculous human beings. Canine tuberculosis originating from infected bovine milk or offal was found to be relatively rare. On the other hand, tuberculosis in cats appeared to be almost exclusively due to bovine type infection of the alimentary origin.—J. L. Mc.

Frozen Plasma

Fresh blood plasma,[70] prepared according to the directions of the Central Institute for Blood Transfusions in ampules or bottles, is placed in a freezing chamber at temperatures of from —15 to —25 C. Before transfusion plasma is thawed by placing the unopened containers into a water bath at a constant temperature of 38 to 40 C. The time required for thawing and warming averages twenty minutes. Only in rare cases does residual flocculation necessitate filtration of plasma. Determinations of viscosity, turbidity, protein fraction and refractive index were carried out before freezing and after thawing. These investigations established the absence of irreversible physiochemical changes of the proteins. The use of frozen plasma does not cause toxic effects. The therapeutic effect of transfused thawed blood plasma is the same as with fresh plasma. Thawed plasma may be used for the same diseases and in the same doses as fresh blood. Like fresh plasma, it is the best blood substitute.

[42] Davis, G. K., and Cole, C. L. *J. Am. Sci.*, 2, p. 53, 1943.

[69] Verge, J., and Seuthille, F. Nouvelles acquisitions sur l' étiologie et la tuberculose des carnivores domestiques. *Rec. Méd. Vet.* 118, pp. 49-69 1942. Abst. from *Vet. Bul.* 15:1, 1945.

[70] Kasanski, V. I., Frozen plasma; new blood substitute. *Am. Rev. Soviet Med.*, 2, p. 207, 1945. Abst. from *J. Am. Med. Assn.*, 128:2, p. 154.

Useful Bulletins, Circulars, Reprints, Etc.

Milk Goats. Farmers' Bulletin No. 920, U. S. Dept. Agr., Washington 25, D. C.

Pullorum Disease, Its Nature and Its Control. Article 27-31, Michigan Agr. Exp. Sta., East Lansing.

Preliminary Results of Artificial Insemination through a Cooperative Enterprise. Article 27-36, Michigan Agr. Exp. Sta., East Lansing.

War Mobilization and Reconversion—First report on the problems of mobilization and reconversion. Director, War Mobilization and Reconversion, Washington, D. C.

Swollen Joints in Range Calves—Due to Infection with *Str. pyogenes* introduced by screw-worm infestation of the navel. A large number of calves were affected. Mortality was 80% last year. Bul. 40, Florida Agr. Exp. Sta., Gainesville.

The War; Phase Two. An outline of the military and industrial effort which will be required to defeat Japan and an attempt to picture civilian conditions that will obtain during the remainder of the War. Director of War Mobilization and Reconversion, Washington, D. C.

Anomalies of Development in Domestic Animals (Trans. title). This 40-page separate from the yearbook (Vol. V, 1942) of the veterinary college deals with supernumerary limbs and digits, in all domestic animals, including poultry, and contains numerous striking illustrations. *Dr. Francisco A. Ubach,* Faculty de Medicina, Veterinaria de La Plata, Argentina.

Report, Division of Livestock Industry. A reprint from the 27th annual report of the Illinois State Department of Agriculture. Ninety full-time veterinarians are employed by the Division. Cattle tuberculin tested during the year numbered 758,256; reactors 0.19%. Brucellosis tests, 691,176; reactors 4.1%; official vaccinations, 25,886 calves. Rabies causes a loss of one-half million dollars' worth of livestock yearly. There were 91 rabies quarantines established during the year in Illinois. Compulsory vaccination of dogs was enforced in several quarantine areas. For example, a rabies quarantine had been in force in Joliet Township from November, 1941, to July, 1943, and during all that period from one to four cases of rabies in dogs developed every week. In July, 1943, compulsory vaccination was ordered and 2,227 dogs were vaccinated. During the remaining 11 months of the fiscal year not one case of rabies developed in the township. "It is the concensus that the vaccination program was as effective in controlling the rabies as a heavy downpour of rain is in controlling a forest fire." The State Department of Health supplied anti-rabies vaccine for the treatment of 5,095 persons during the year. Twenty-nine dead animal disposal plants are licensed by the Division.—C. E. Fidler, State Veterinarian, Springfield, Ill.